TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

NOVEMBER 1, 1960
Price 50c

ECONOMIES OF LINE CONCENTRATORS, by R. C. Hunt

Traffic Looks At Person, Collect And Special Service D D D

THE IMPERATIVES OF PUBLIC SERVICE, by D. B. Corman

Industry Cohesion And Cooperation, by Harold C. Ebaugh

Let our "Revenue Men"

TAKE THE KINKS OUT OF YOUR KNOTTY DIRECTORY PROBLEMS!

Take a man like
Joe Mirabella...

Joe is one of our "revenue men" in St. Paul, Minnesota.

Young, energetic, he is representative of the "revenue men" who help telephone companies increase their revenue from directory sales.

Joe started work at the General Telephone Directory Company as a sales representative in Muskegon, Michigan, in 1954. In 1958, he was promoted to sales supervisor of the Owosso unit. In 1959, he was transferred to his present post in St. Paul.

He and his wife and three daughters now live in Minnesota. Always interested in community affairs, Joe has held the positions of Post Commander, District Vice-Commander and State Housing Chairman of the American Legion. He has also devoted his time and efforts to the VFW, Community Chest and Red Cross.

Joe is typical of the "revenue men" who work for General Telephone Directory Company—and for you. Men who are an asset to any community in which they live.

Our Directory "Revenue Men" provide the Independent Telephone Industry with a flexible and highly skilled telephone directory organization. These men—working out of 35 strategic locations—are experienced specialists, trained to give you *complete* and *quality directory service.*

They act as telephone company representatives in their day-to-day contacts with your customers, not only selling and supervising the sale of Yellow Pages advertising—but also acting as public relations representatives for you in their dealings with the public.

Thoroughly trained to know any condition that pertains to telephone service, they're experienced hands at helping large and small Independent Telephone Companies "take the kinks out of knotty directory problems!"

Write or phone our office nearest you for our Complete Directory Service Plan.

GENERAL TELEPHONE DIRECTORY COMPANY

1800 Oakton Boulevard
Des Plaines, Illinois
VAnderbilt 7-6111

DIVISION OFFICES:
Bloomington, Illinois • Columbia, Mo. • Durham, N. C. • Erie, Pa.
Fort Wayne, Ind. • Honolulu, H. I. • Lexington, Ky. • Long Beach, Calif.
Madison, Wis. • Manila, P. I. • Muskegon, Mich. • St. Paul, Minn.
San Angelo, Tex. • San Francisco, Calif. • Spokane, Wash. • Tampa, Fla.

TELEPHONE ENGINEER & MANAGEMENT

Published on the 1st and 15th of each month by

TELEPHONE ENGINEER PUBLISHING CORP.
7720 Sheridan Road, Chicago 26, Ill.

Telephone
ROgers Park 4-3040
Chicago

EDITORIAL STAFF

ROY F. SMITH
Publisher

JOHN G. REYNOLDS
Editor

DICK REYNOLDS
Production Mgr.

JANE KELLEY
Editorial Assistant

JOHN S. REED
Technical Editor

ROLAND DAVIES & FRED HENCK
Washington Editors

Contributing Editors
BILL CORMAN
C. D. EHINGER
L. A. GRITTEN
D. A. PERIGO
ALLAN R. STACEY

ADVERTISING STAFF

DONALD C. SORENSEN
Advertising Manager

RAY GERACI
Promotion Manager

BETSY MEYERS
Advertising Assistant

KEITH H. EVANS & ASSOCIATES
3723 Wilshire Blvd.
Los Angeles 5, Calif.
Tel. — DUnkirk 8-2981
515 Market St., Rm. 225,
San Francisco 5, Calif.
Tel. — YUkon 2-4280

BUSINESS STAFF

ROY F. SMITH
President

DONALD C. SORENSEN
Executive Vice President

JOHN G. REYNOLDS
Vice President

BETTY SCHROEDER
Corporate Secretary

PAT LAWHORN
Circulation Manager

BPA

Member of
Business Publications
Audit of Circulation, Inc.

Average Total Qualified Circulation For 12-Month Period Ending June 1960, 13,817

TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

VOL. 64 NO. 21 NOV. 1, 1960

CONTENTS

ACCOUNTING
Recent and Possible Changes In Accounting — D. F. MacEachern — 32

ASSOCIATIONS
Coming Conventions — 14

FINANCIAL
Communications Securities — 73

NEWS & COMMENTS
The Back of The Book — John G. Reynolds — 86

PLANT
The Economies of Line Concentrators — Robert C. Hunt — 26

PRODUCTS & SERVICES
New Products' Showcase — Dick Reynolds — 52

The Telephone Market Place (Classified Advertising) — 82

Advertisers' Index — 85

SERVICE
The Imperatives of Public Service — Daniel B. Corman — 30

TELEPHONE INDUSTRY
Industry Cohesion and Cooperation — Harold C. Ebaugh — 39

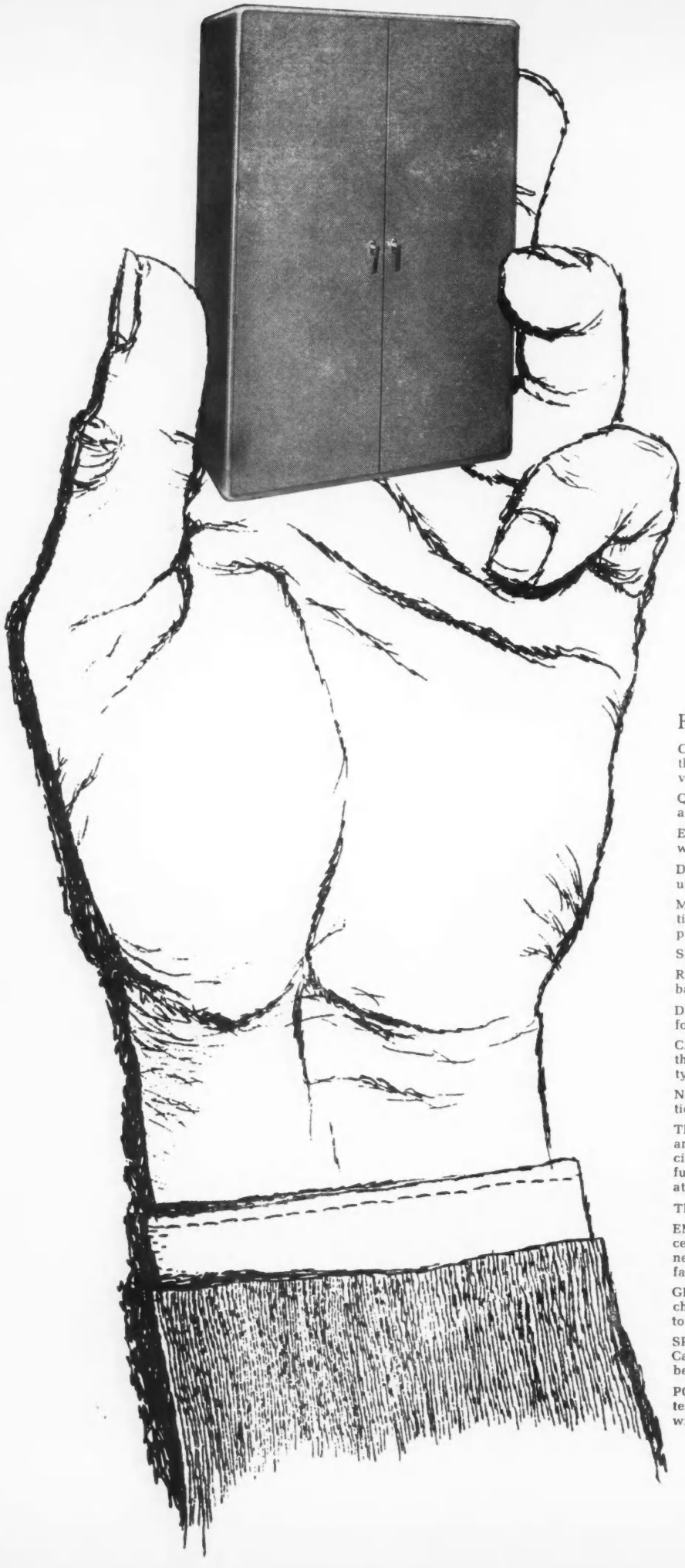
TRAFFIC
Traffic Looks at Person, Collect & Special DDD — John B. Noggle — 28

Long-Range Functions of Traffic — W. A. Kern — 42

THE TE&M FRONT COVER

Missouri Telephone Association held two district meetings in September. Top photo shows Independents who attended the Springfield meeting. Bottom photo was taken during luncheon at the Columbia meeting.

Volume 64, No. 21. Published on the 1st and 15th of each month by TELEPHONE ENGINEER PUBLISHING CORP., 7720 Sheridan Rd., Chicago 26, Ill. Office of publication 600 S. 7th St., Rochelle, Ill: Subscriptions, U. S. and Possessions, $4.00 per year; Canada, $4.50; in all other countries. $6.50. Single Copies, U. S. A., 50 cents. Entered as Second Class matter at the post office at Rochelle, Ill. under the act of March 3, 1879. Copyright 1960 by Telephone Engineer Publishing Corp., 7720 N. Sheridan Rd., Chicago 26, Ill.
POSTMASTER . . . Please send form 3579 to TELEPHONE ENGINEER & MANAGEMENT, 7720 N. Sheridan Rd., Chicago 26, Ill.



NEW!

FEATURES OF THE F-80A PBX

COMPACT–Takes only 8 square feet; rolls easily through standard doors–on and off passenger elevators.

QUIET–Thick acoustical insulation inside doors and sides makes unit practically free from noise.

EFFICIENT–Twenty-four-hour service, with or without attendant.

DEPENDABLE–Time-proven components assure uninterrupted performance of dial system.

MOBILE–Large rubber casters permit exact positioning anywhere. Flexible–push it against wall, pull out for inspection . . . lock in place.

SINGLE-PARTY LINES–provide fast service.

RESTRICTED SERVICE–provided on a per line basis.

DIRECTORY NUMBERS–simple, two-digit numbers for trunks.

CALL DISTRIBUTION–calls are distributed over the finder-connector links by a single rotary switch type allotter circuit.

NIGHT SWITCHING–permits predetermined stations to be connected with central office trunks.

TRANSFER SERVICE–permits incoming call to be answered at any station simply by dialing into circuit; call may be extended once. Especially useful at night for watchmen or at any time during attendant's absence.

TIE-LINES–provision for tie-lines, of course!

EMERGENCY OPERATION–emergency service to central office by switching to the night trunk connection in the event of a temporary AC power failure.

GENERAL FEATURES–dial tone, busy tone, machine ringing, immediate ring trip, and ring-back tone are standard.

SPECIAL FEATURES–Conference Service, Code Call equipment and Executive Right-of-Way may be supplied as extras.

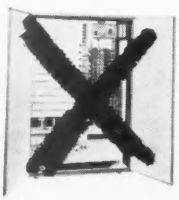
POWER–48V DC is supplied from a 6-ampere battery eliminator. All power equipment is mounted within the cabinet.

F-80A XY® PBX

Double capacity

*No increase in price**

No increase in space



The F-40A Dial PBX has long been recognized for its all-around excellence.

Now Stromberg-Carlson offers you the same quality features (see facing page) *plus many more* in the new F-80A. You can now furnish your commercial subscribers with *double* the capacity in the same amount of space. No increase in price.

Ask your Stromberg-Carlson representative how we did it!

The capacity of the F-80A is 80 lines—14 trunks—14 links. Its *flexibility* is unmatched.

- Universal trunk jack permits use of any of 5 types of trunks or any combination:

1. Combination trunk associated with turret. 2. Combination trunk associated with cord-type attendant's cabinet. 3. E & M dial to dial trunks. 4. Loop dial to dial trunks. 5. Ring-down trunks.

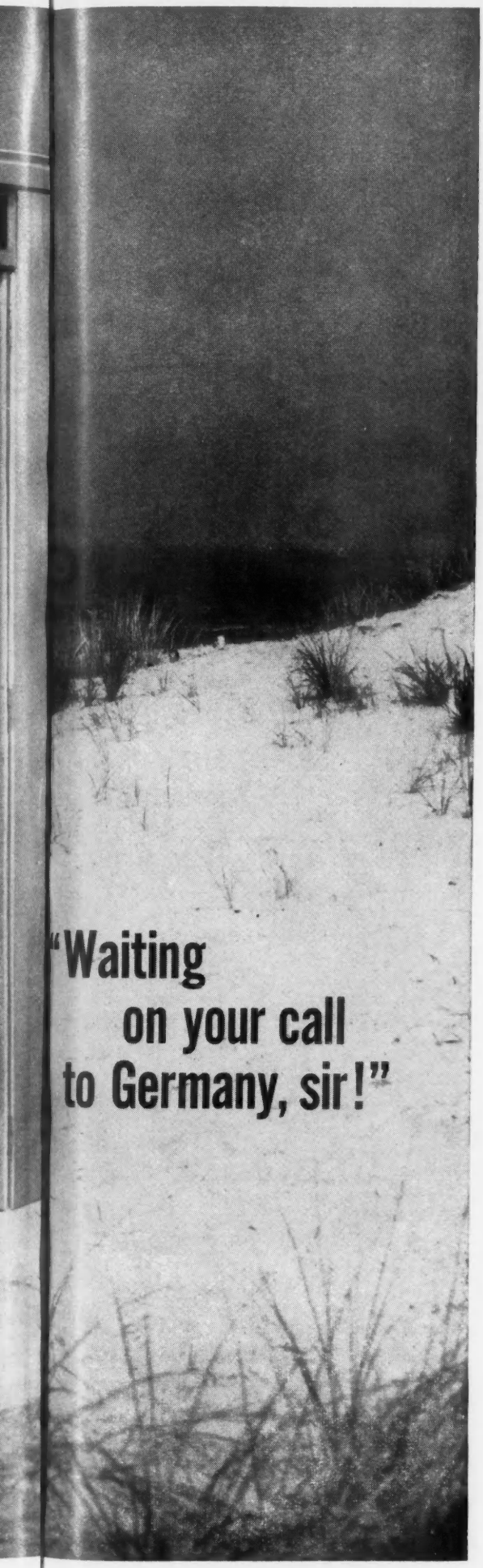
- Attendant's turret can be the regular F-80A Cordless or the cord-type cabinet.
- Expansion is by jack-in circuit plates.

PROMPT DELIVERY! Contact your Stromberg-Carlson representative now. In Atlanta call TRinity 5-7467; Chicago: STate 2-4235; Kansas City: HArrison 1-6618; Rochester: HUbbard 2-2200; San Francisco: OXford 7-3630.

*Priced right! Ask our representative to prove it.

STROMBERG-CARLSON
A DIVISION OF **GENERAL DYNAMICS**

TELEPHONE
TELEPHONE
GENERAL
SYSTEM



No—Portage, Indiana is not on the seacoast, but on a small stretch of Indiana's inland coast, bordering Lake Michigan. Yet, it's 800 miles closer to Hamburg, Germany, than New Orleans, La., is! And thereby hangs our tale.

Except for sea gulls and great blue heron, beavers and an occasional Boy Scout, the beach near Portage, Ind., is sparsely populated—right now. But not for long. For this is the site of a town-to-be . . . a harbor for ocean-going vessels . . . a steel production center that is expected to employ more than 50,000 people!

General Telephone Company of Indiana already has completed plans for serving Portage Township . . . will spend more than $2 million in the proposed construction and conversion program. And, it is expected, some 3,000 telephone customers will be connected to the new facilities at conversion time.

A significant number of the new facilities will be Alcoa® Aluminum booths. Because Alcoa booths serve so many so well in other locations, GEN TEL decided they will earn high revenue—with low maintenance costs—here, too. Because aluminum defies corrosion, the moist lake air and buffeting, sand-laden winds won't hurt it a bit. And because Alcoa booths are colorful, well lighted and sturdy, they attract users! Easily maintained, dirt and grime may be washed off with plain water . . . and aluminum never needs painting!

For more information about Alcoa Aluminum outdoor booths . . . and the new Alcoa compact aluminum booth, write Aluminum Company of America, 1721-L Alcoa Building, Pittsburgh 19, Pa.

"We chose Alcoa booths because they're light in weight yet sturdy," says Mr. P. E. Platt (left), Northwestern Division manager for GEN TEL. "They require a minimum of maintenance, are well lighted, colorful—and really attract users," adds Mr. J. D. Canfield, GEN TEL's district commercial manager.

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

Bury your maintenance costs with Anaconda PCP and PCPG cables

Direct burial offers many cost-cutting possibilities – (1) freedom from storm damage, (2) freedom from tree-clearing and retrimming expenses, (3) freedom from the hazards associated with power contacts and pole climbing, (4) freedom from right-of-way procurement difficulties.

Anaconda PCP and PCPG cables offer you *extra* cost-cutting features. Here are a few of them:

1. Outstanding resistance to lightning damage – a copper shield and a high-molecular-weight polyethylene belt over the core make the over-all cable highly resistant to lightning damage. The high-molecular-weight polyethylene conductor insulation protects against allati
ductor-to-conductor lightning damage.

2. Water vapor will not cause failure – be e di
of the excellent moisture resistance of the high-mole a dif
weight polyethylene insulation. istar

3. Full color coding – makes for low-cost instal ield.
by fast, easy splicing and terminating. Eliminates test all r
ing. All it takes is a one-man crew. And – all these a ch sh
tages are repeated every time you add or change term ssibil

4. Easy handling – this lightweight cable wi Find
rugged corrugated shield permits easy handling duri n hel

allation, plowing, and burial.

Should you select PCP or PCPG?

he difference between Anaconda PCP and PCPG cables a difference in thickness of the corrosion-resisting, low-sistance copper shield. PCP cable, having a 0.005-inch ield, is intended to withstand attack by termites and all rodents, such as field mice. PCPG cable, with a 0.010-ch shield, is for use in areas where gopher attack is a ssibility.

Find out if direct burial of Anaconda PCP or PCPG cable n help you reduce your operating and maintenance costs.

Call your nearest Anaconda district office direct. Or write: The Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

60245

PHONE THE MAN FROM

ANACONDA®

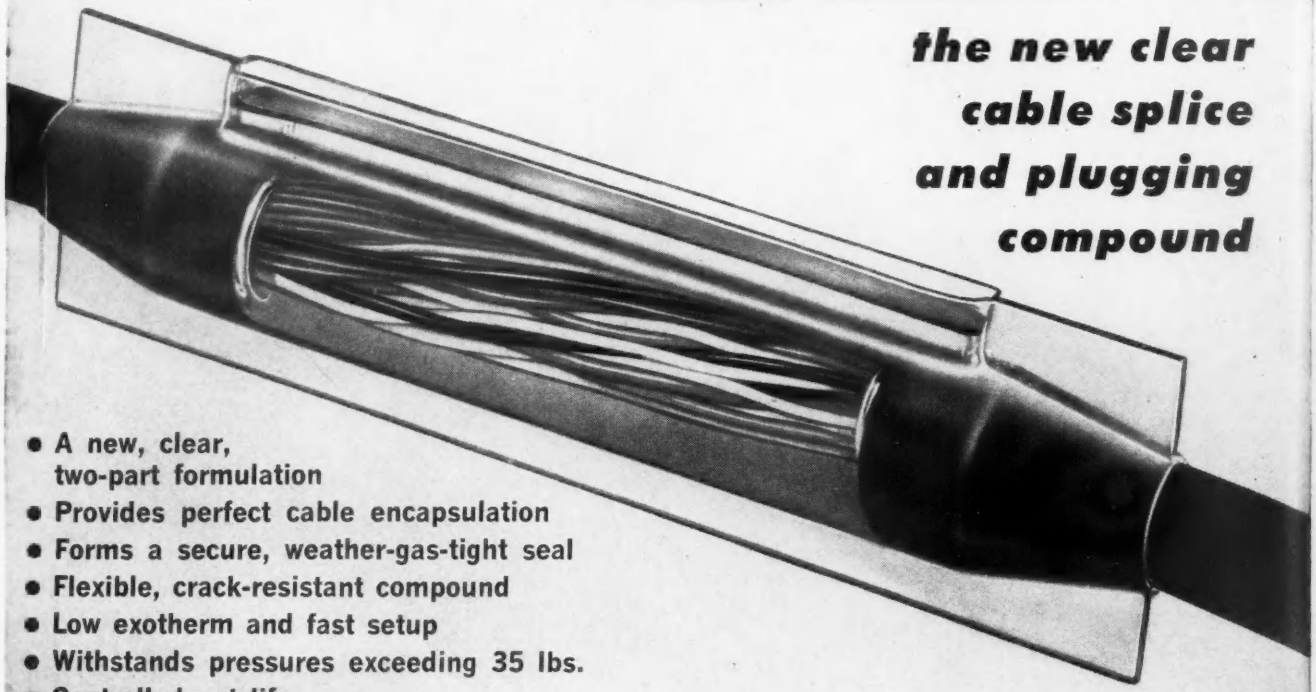
FOR PCP AND PCPG TELEPHONE CABLE

the independent manufacturer
for the independent telephone industry

INTRODUCING

SEMPER • SEAL

the new clear cable splice and plugging compound

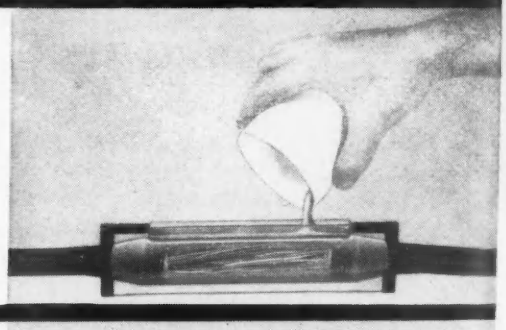


- **A new, clear, two-part formulation**
- **Provides perfect cable encapsulation**
- **Forms a secure, weather-gas-tight seal**
- **Flexible, crack-resistant compound**
- **Low exotherm and fast setup**
- **Withstands pressures exceeding 35 lbs.**
- **Controlled pot life**
- **Controlled cable penetration**

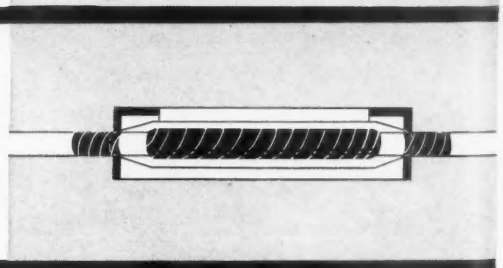
Semper-Seal, a new epoxy-type resin incorporating the advantages of proven durability, weather-tight sealing and transparent clarity for perfect cable encapsulation. The simple to use and transparent qualities of Semper-Seal enables field splices and blocks to be accomplished and inspected in a minimum of time with the visible assurity of knowing a solid seal has been made. Semper-Seal is a two-part compound consisting of a resin and hardener which when mixed together create a thermosetting action. The compound, through its own chemical change will, in 30-45 minutes, become a solid, clear, air-tight seal.

Write today for complete information on NEW Semper-Seal.

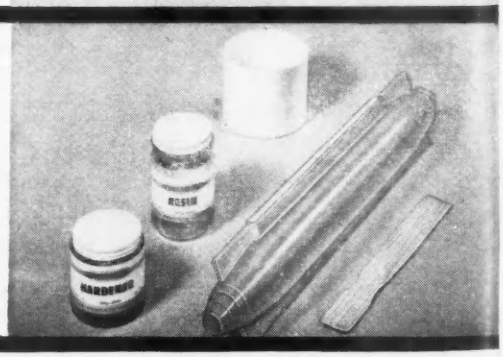
C & S PRODUCTS COMPANY
Windsor Locks, Connecticut



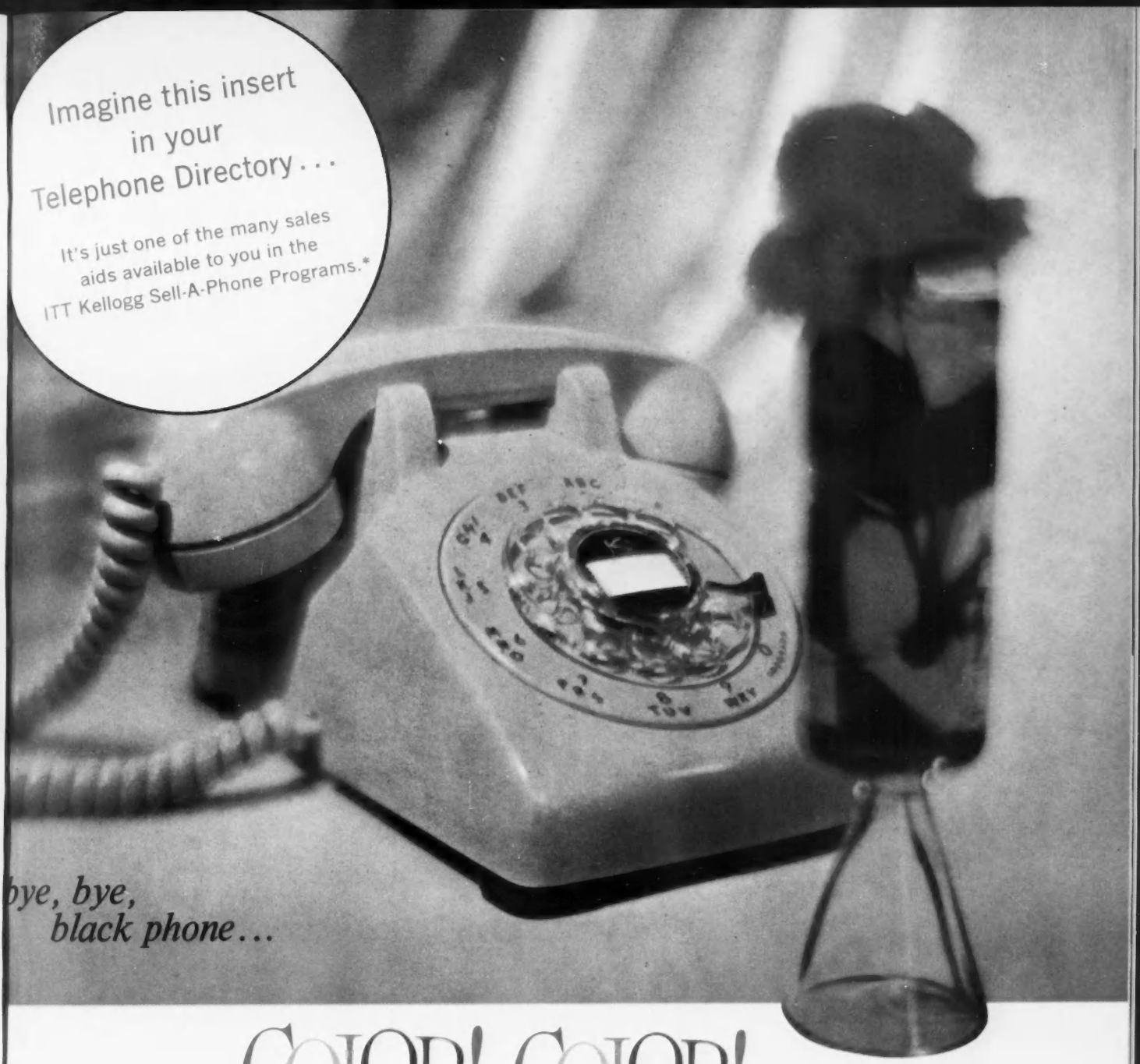
Semper-Seal being poured into the plastic Vu-Mold which has been tape-sealed over the cable opening.



Semper-Seal provides an ideal means of forming trouble splices on pressurized cables.



Semper-Seal is available in convenient kits or in bulk form.


Imagine this insert
in your
Telephone Directory . . .
It's just one of the many sales
aids available to you in the
ITT Kellogg Sell-A-Phone Programs.*
bye, bye,
black phone . . .

today it's COLOR! COLOR! everywhere!

Everywhere you look these days you see these signs of fashion: vivid color accents and accessories . . . and everywhere you look you see modern color telephones.

How long has it been since someone noticed *your* telephone? For comments galore, go color!

a rainbow of lively decorator-approved colors

your local

ITT KELLOGG

representative will be in soon...

PLAN I
SELL-A-PHONE "SALESMEN IN PRINT" CAMPAIGN
NEWSPAPER AD MATS
On Extension Phones, Color Phones, Two Line Phones, Lift-To-Talk
DIRECT MAIL PIECES
On every service you offer
ENVELOPE STUFFERS
To include in invoices, letters, etc.
COLORFUL TELEPHONE DIRECTORY INSERTS
For use in your local directory
DYNAMIC POSTERS
Can be used on windows, walls, trucks, bill boards
RADIO COMMERCIALS, NEWS RELEASES
Written by experts... to sell every service
SELLING TIPS
Tells how to promote for maximum sales
PLAN II
PERSONAL SOLICITATION BY TRAINED SALES PEOPLE
Over the phone...or door-to-door, a trained "taskforce" of sales personnel can sell your services to many potential prospects who simply "never got around to ordering that color phone"
PLAN II
SELL-A-PHONE "TASK FORCE" DIRECT SELLING CAMPAIGN
IN LARGER URBAN AREAS
IN SMALLER AREAS
INSTRUCTION MANUAL ON DIRECT-SELL METHODS
NEWSPAPER AD MATS
NEWSPAPER AD MATS
PLAN 2.

with the complete story on the most complete and unique Marketing/Sales Promotion Program in the history of independent telephony . . .

SELL-A-PHONE

EVERYTHING TO SELL MORE HOME TELEPHONE SERVICES

. . . both to subscribers and non-subscribers

3 COMPLETE SALES PLANS:

Complete with all the advertising and sales promotion material necessary to make them successful . . . with little effort on your part.

EVERYTHING TO SELL MORE BUSINESS SUBSCRIBER SERVICES

. . . for every size, every kind of business

THE FIRST TRULY PORTABLE KEY-PHONE DEMONSTRATION KIT . . .

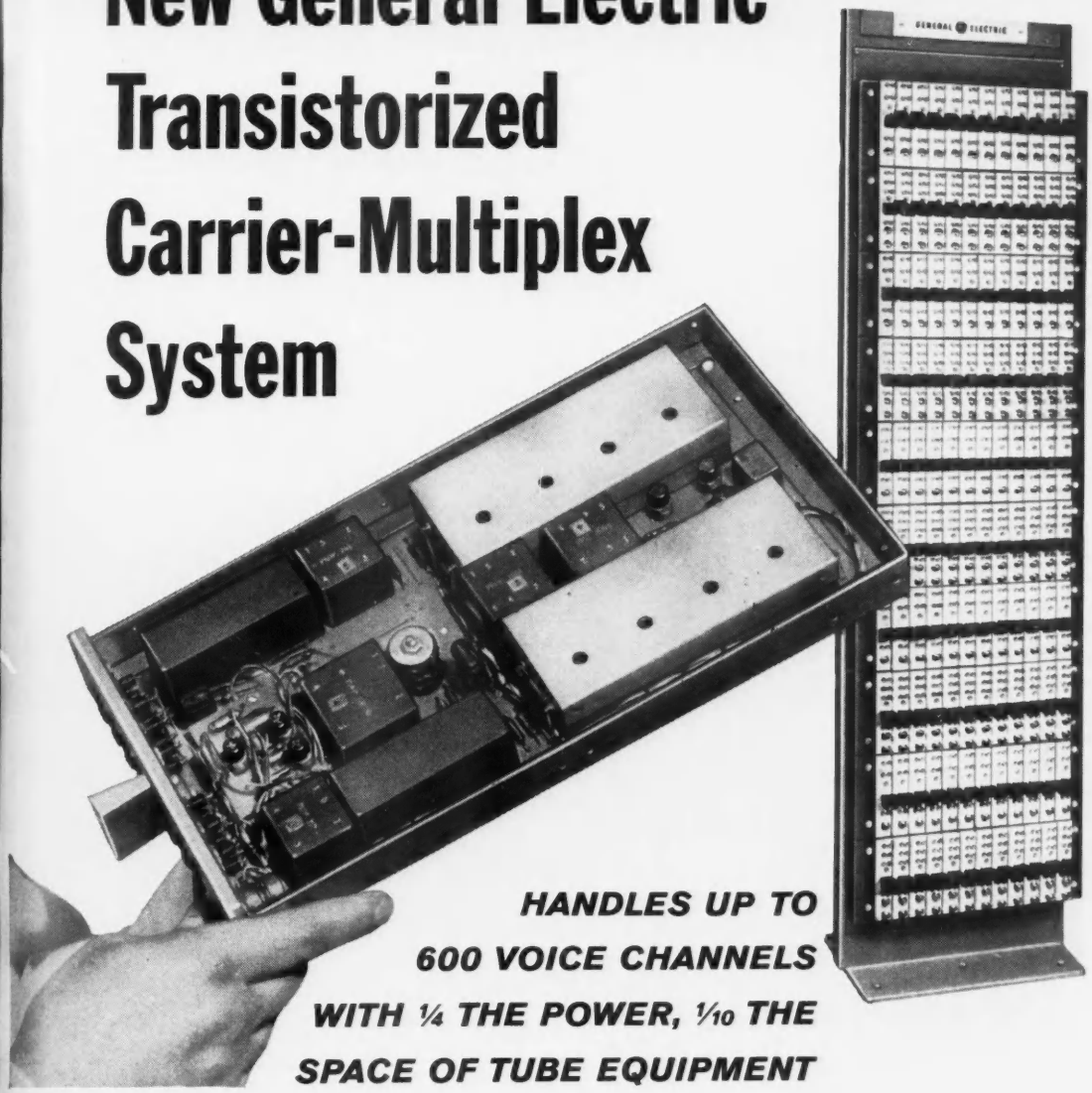
. . . plus all the material

- to get inquiries
- to follow through
- to quote on installations
- to train your salesmen

ITT KELLOGG

A Division of International Telephone and Telegraph Corporation
6650 South Cicero Avenue, Chicago 38, Illinois

New General Electric Transistorized Carrier-Multiplex System



HANDLES UP TO 600 VOICE CHANNELS WITH ¼ THE POWER, ⅒ THE SPACE OF TUBE EQUIPMENT

General Electric's new TCS-600 is the world's first fully transistorized carrier-multiplex system capable of handling from one to 600 voice channels on either metallic circuits or a single radio circuit. A single sideband suppressed carrier system, the TCS-600 meets or exceeds all domestic and CCITT standards.

Power Requirements: The TCS-600 consumes less than 900 watts of DC power for 600 voice channels with terminations — only 8 to 25 per cent of the power needed by tube equipment. Users will realize dramatic savings in purchased power, station batteries and chargers.

Mounting Space: Thanks to transistorization, the TCS-600 takes only one-third to one-tenth the space occupied by conventional tube equipment. Now 600 voice channels will fit into the same area taken by 120 channels of tube equipment. You can expand at any time to full capacity without costly rewiring or building alterations.

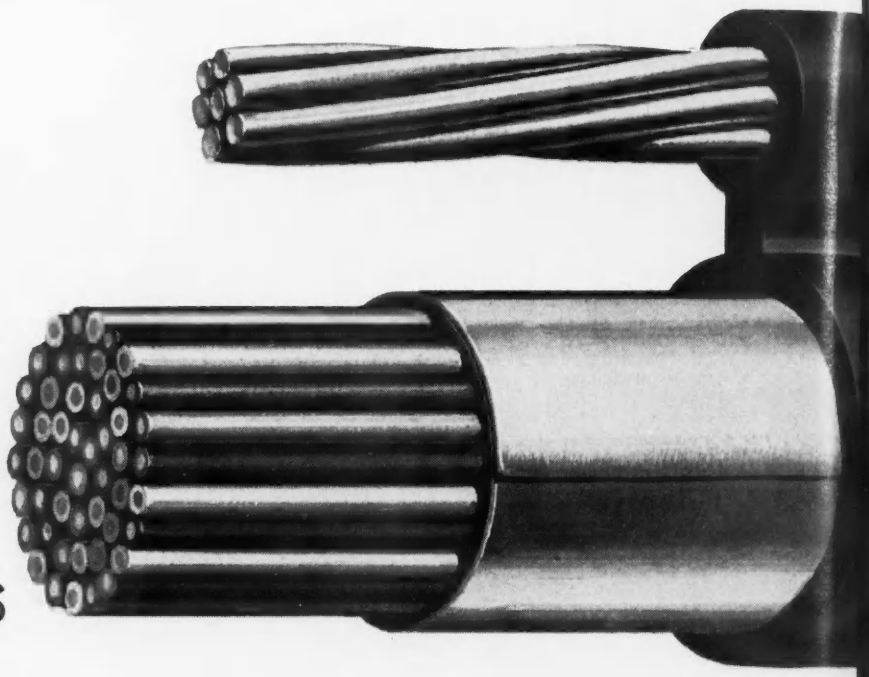
No Relays: The TCS-600 is the first carrier system to bring you the full benefits of completely static operation. No relays are used — all signalling, alarm indication and switching are accomplished by silicon controlled rectifiers or power transistors.

Reliability: The TCS-600 has a parallel circuit for each active circuit in the common equipment. Thus if any circuit should fail, all but a single voice channel will continue to operate via the parallel circuit.

Long Life: Carefully selected transistor types, operating well below recommended temperature and current ratings, assure exceptionally long life for the TCS-600. Lower operating temperatures also greatly extend the life of other components.

You'll be surprised by the low first cost and high yearly savings made possible by the TCS-600. For full details, write General Electric Company, Communication Products Dept., Section 45110-1 Mountain View Road, Lynchburg, Va.

GENERAL ELECTRIC



GENERAL CABLE'S

FIGURE 8 QUALPETH*

ends cable spinning...saves you time and money

Here's a great new cable that saves you time and money on outside plant construction. Figure 8 Qualpeth combines the cable and messenger in a single jacket of tough polyethylene. This revolutionary cable makes installation a one-step process. The entire cable-spinning operation is eliminated. Your lineman merely clamps Figure 8 to the pole.

Figure 8 is equipped with your choice of aluminum or copper shield. Normal splicing methods and closures are used. And, best of all, Figure 8 costs less installed than cable and messenger installed separately!

We're saving a copy of the Figure 8 Qualpeth catalog for you. To get your free copy, write: Automatic Electric Sales Corporation, Northlake, Illinois. And the next time you want to extend your outside plant, contact your AE representative. He'll give you all the money-saving details on Figure 8 Qualpeth.

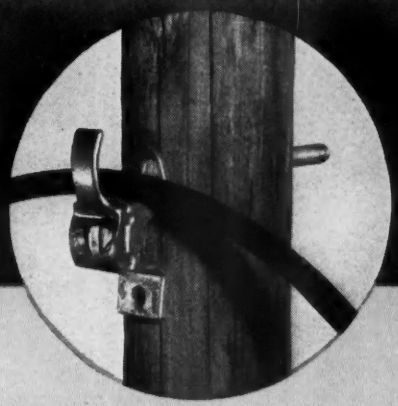
**Trademark of General Cable Corporation*

AUTOMATIC ELECTRIC

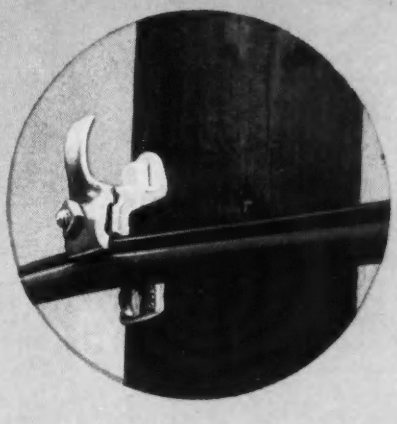
Subsidiary of

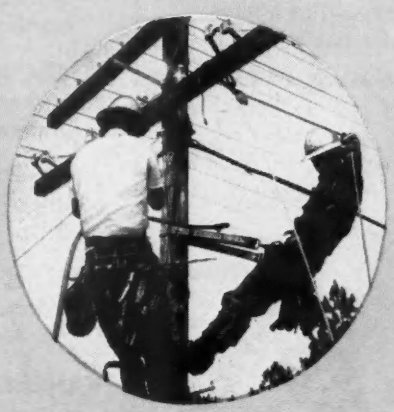
GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM



SPECIAL SUPPORT MAKES INSTALLATION EASY
This specially designed clamp is bolted to the pole to serve you two ways. First, the cable is strung over the top of the clamp for easy handling. After tensioning, the lineman just clamps Figure 8 to the pole, and the job's done.



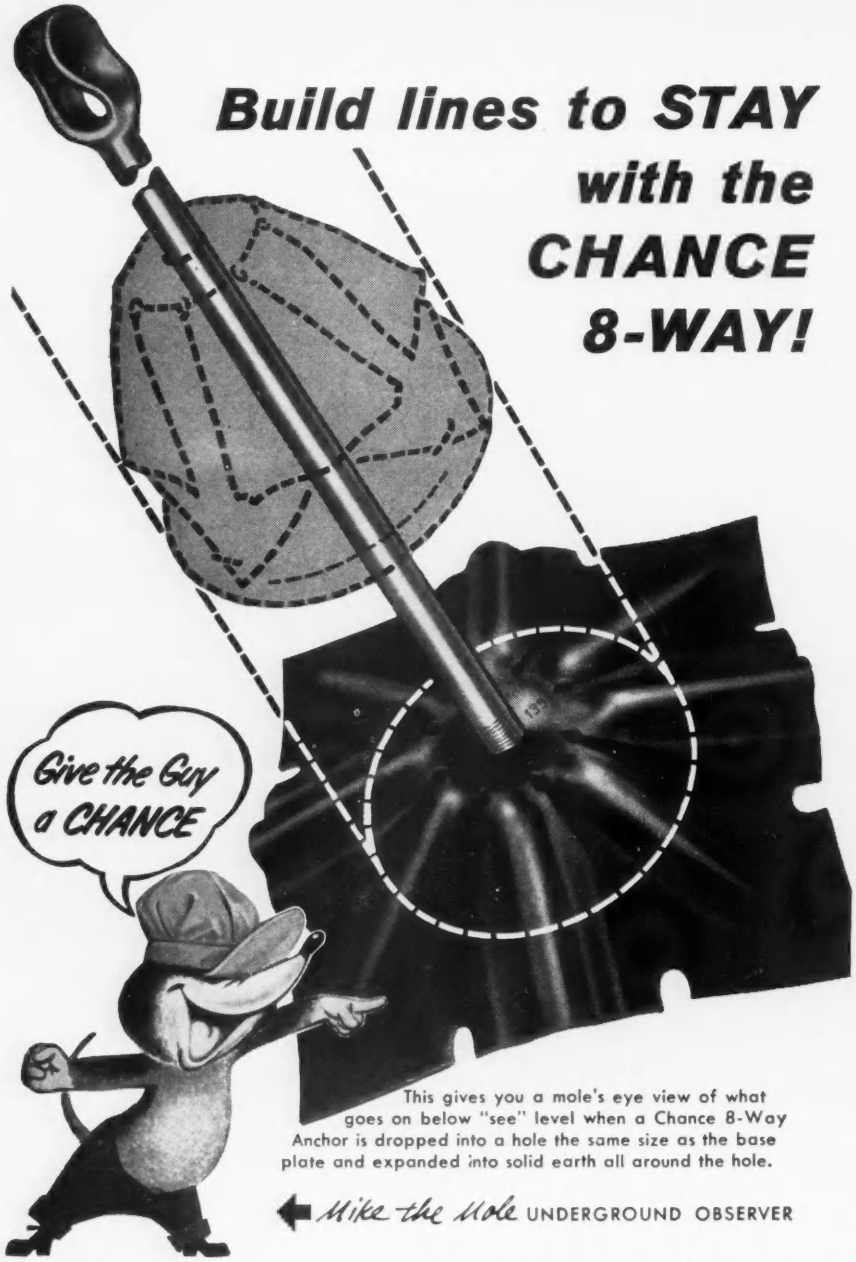


CREW INSTALLS FIGURE 8 FASTER
At a recent installation of Figure 8, the crew saved so much time that the in-place cost was reduced by 10% over the cost of the present cable-spinning methods.

Warehouses:

North Lake Illinois Fillmore 5-7111	2915 Moore St. Richmond 21, Va. ELgin 8-9280	2360 N. W. Quimby St. Portland 10, Ore. CApital 3-7244	158 Corliss Avenue Johnson City, N. Y. RA 9-4996	2021 Main St. Kansas City 8, Mo. HArrison 1-7575

Build lines to STAY with the CHANCE 8-WAY!



This gives you a mole's eye view of what goes on below "see" level when a Chance 8-Way Anchor is dropped into a hole the same size as the base plate and expanded into solid earth all around the hole.

Mike the Mole UNDERGROUND OBSERVER

8-Way Expanding Anchors give you all 'round holding power

Only the Chance 8-Way Expanding Anchor, with its 8 rib-reinforced blades, expands into solid earth *all the way around* to form a pyramid-like square.

This design adds strength to expanding anchors. The pyramid enlarges the effective area of the anchor's holding power. Blades that expand side by side leave no wasted space between them—can be shorter, less apt to bend, and expand in a wide area of solid earth all around the hole.

Make the Chance 8-way *your* standard for the kind of guying you can install and forget. Available from your anchor distributor, in sizes from 60 to 200 sq. in. in area.

. . . and there are CHANCE ANCHORS for all other soil and guying conditions

A·B·CHANCE CO· CENTRALIA MISSOURI

(A·B·CHANCE CO. of Canada, Ltd., Toronto) CA58-3

coming CONVENTIONS

GEORGIA Tel. Assoc., Biltmore Hotel, Atlanta, Ga., Nov. 9-10.

OKLAHOMA Tel. Assoc., Skirvin Hotel, Oklahoma City, Okla., Nov. 9-10.

ALABAMA Tel. Assoc., Thomas Jefferson Hotel, Birmingham, Ala., Nov. 14-15.

FLORIDA Tel. Assoc., Robt. Myer Hotel, Jacksonville, Fla., Nov. 28-29.

MILITARY ELECTRONICS CONVENTION, Biltmore Hotel, Los Angeles, Calif., Feb. 1, 2, 3, 1961.

LOUISIANA Tel. Assoc., Captain Shreve Hotel, Shreveport, La., Feb. 15-17, 1961.

MINNESOTA Tel. Assoc., Radison Hotel, Minn., Minn., Feb. 19-22, 1961.

KENTUCKY Tel. Assoc., Phoenix Hotel, Lexington, Ky., March 7, 1961.

TEXAS Tel. Assoc., Rice Hotel, Houston, Texas, March 12-14, 1961.

IOWA Tel. Assoc., Savery Hotel, Des Moines, Iowa, March 23-24, 1961.

INTERNATIONAL POLYTECHNIC SYMPOSIA, Auditorium of the Engineering Societies, New York City, April 4-6, 1961.

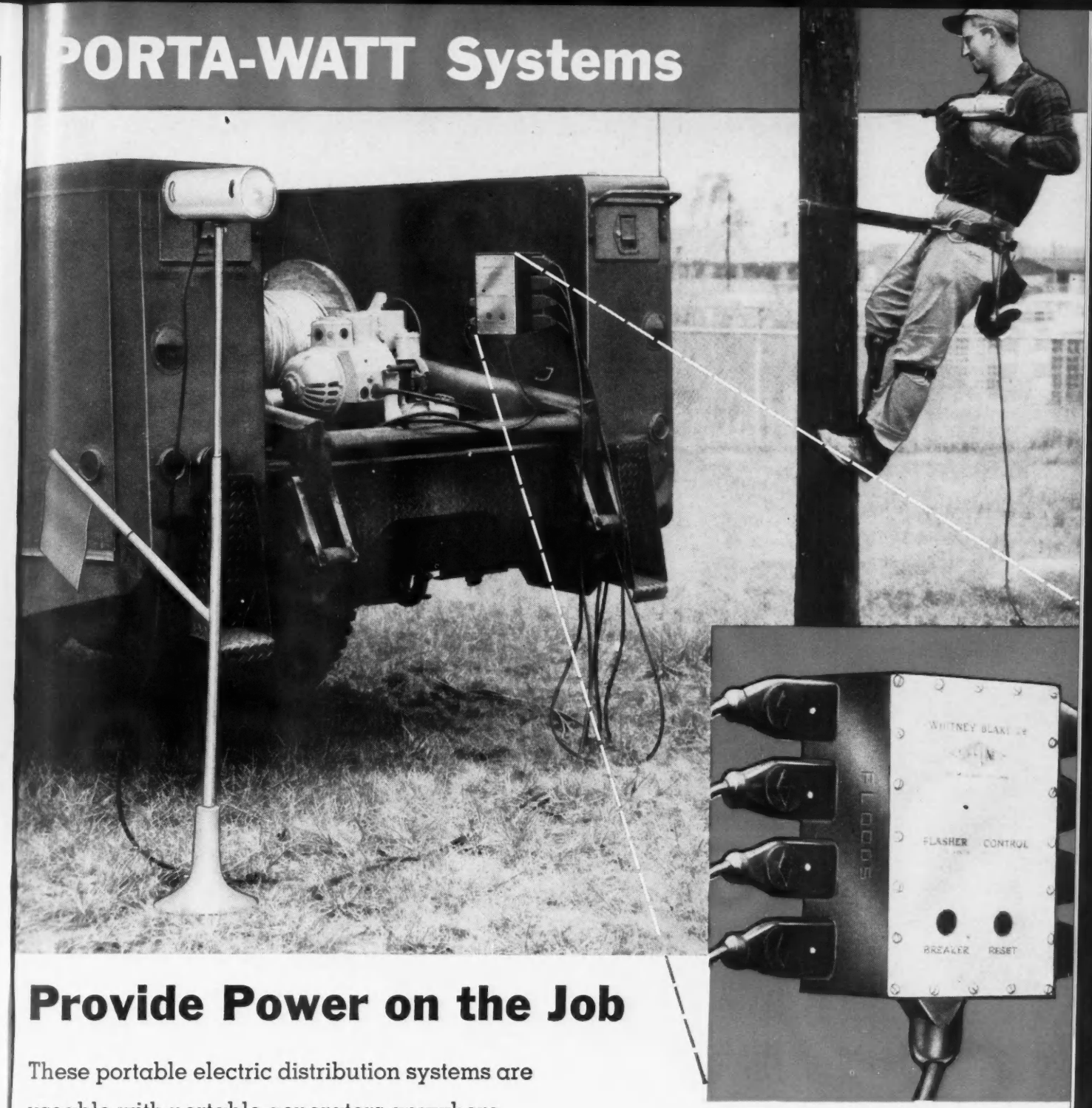
NEBRASKA Tel. Assoc., Cornhusker Hotel, Lincoln, Nebraska, April 5-6, 1961.

OHIO Tel. Assoc., Deshler Hilton Hotel, Columbus, Ohio, April 18-19, 1961.

ILLINOIS Tel. Assoc., Pere Marquette Hotel, Peoria, Ill., May 17-19, 1961.

KANSAS-MISSOURI Tel. Association, Continental Hotel, Kansas City, Mo., May 22-23, 1961.

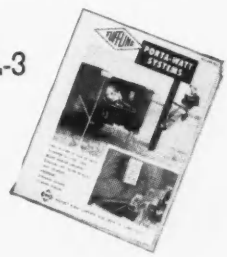
PORTA-WATT Systems



Provide Power on the Job

These portable electric distribution systems are useable with portable generators anywhere. Installation and maintenance crews can be entirely independent of fixed power sources.

FREE — send for descriptive Bulletin TL-3



Note these Features

Easily attached to truck or trailer.
Interrupted and/or steady power.
Molded neoprene components.
DYNAPRENE Cord, yellow or black
Safety engineered.
Completely waterproof
Accessories and extensions available.

WB WHITNEY BLAKE CO.

TUFFLINE DIVISION

NEW HAVEN 14, CONNECTICUT · TELEPHONE CHestnut 8-5515 TWX: NH84

Are you operating your company as a HOBBY OR A BUSINESS?

No business can endure without profit.

The key to profit is, of course, **increased** revenue! For the operating telephone company extension installations offer the prime opportunity to realize revenue increases!

The Ericofon is the biggest boost you can give yourself in your extension promotions! Subscribers want Ericofons—this has been proven over and over! **No other telephone** has the built-in appeal of the Ericofon, the built-in convenience of the Ericofon, the built-in beauty of the Ericofon, the built-in profit potential of the Ericofon.

North will help you in your extension promotions—North's Ericofon merchandising aid has already established a whole new pattern for the entire industry! The combination of Ericofons and Ericofon merchandising materials and plans—**available to you at no cost**—has worked successfully for countless companies already!

Are you losing revenue that could be yours? If you're not offering your subscribers Ericofons—you **are** losing revenue every day!

NOT SURE YET? YOU CAN GET PROOF FROM . . .

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

Galion, Ohio

NORTH

60-T-3

1187 Revenue-Boosters:

are as hot as a firecracker. Total
and selling at a rate of over 70 a mont
keyset turrets save space, handle ca
switchboards increase traffic capacit
able service features. Fast delivery.

Write today.

LEICH

Subsidiary of
GENERAL TELEPHONE & ELECTRONIC

eich PABX's

187 in service—

hy? Exclusive

uickly. All-relay

he most desir-

TYPICAL LEICH PABX INSTALLATIONS

PHILCO CORPORATION
PALO ALTO, CALIFORNIA

WINTER PARK HOSPITAL
WINTER PARK, FLORIDA

HAWAII BREWING CO. LTD.
HONOLULU, HAWAII

KHVH RADIO & TV STATION
HONOLULU, HAWAII

BUTLER MANUFACTURING CO.
GALESBURG, ILLINOIS

HANNIFIN MANUFACTURING CO.
DES PLAINES, ILLINOIS

STOVER STEEL TANK & MFG. CO.
FREEPORT, ILLINOIS

OLIN MATHIESON COMPANY
ORDILL, ILLINOIS

MODINE MANUFACTURING CO.
LA PORTE, INDIANA

MANCHESTER COLLEGE
NORTH MANCHESTER, INDIANA

FARMERS STATE BANK
VALPARAISO, INDIANA

U.S. GYPSUM COMPANY
FORT DODGE, IOWA

JASPER COUNTY BANK
NEWTON, IOWA

UNITED CARBON COMPANY
RYUS, KANSAS

STERLING HARDWARE CO.
HAZARD, KENTUCKY

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
LEXINGTON, KENTUCKY

KENTUCKY STATE HIGHWAY DEPT.
MOREHEAD, KENTUCKY

WABJ RADIO STATION
ADRIAN, MICHIGAN

NEW MOON HOMES
ALAM, MICHIGAN

BOONE COUNTY BANK
COLUMBIA, MISSOURI

NEBRASKA STATE TEACHERS COLLEGE
KEARNEY, NEBRASKA

ROBINSON & SMITH
GLOVERSVILLE, NEW YORK

LEVIN FURNITURE COMPANY
PORT JERVIS, NEW YORK

AMERICAN BANK & TRUST CO.
MONROE, NORTH CAROLINA

1ST FEDERAL SAVINGS & LOAN
DEFIANCE, OHIO

FORD MOTOR COMPANY
LIMA, OHIO

CAMPBELL SOUP COMPANY
NAPOLEON, OHIO

PITTSBURGH PLATE GLASS CO.
MT. VERNON, OHIO

McAULEY HOSPITAL
COOS BAY, OREGON

WASHINGTON COUNTY COURT HOUSE
HILLSBORO, OREGON

NORTH BEND MEDICAL GROUP
NORTH BEND, OREGON

INTERNATIONAL PAPER CO.
REEDSPORT, OREGON

A. O. SMITH COMPANY
ERIE, PENNSYLVANIA

UNION CARBIDE & CHEMICAL CO.
SEADRIFT, TEXAS

THORNHILL PUBLISHING CO.
EVERETT, WASHINGTON

THRIFTWAY STORES
LYNWOOD, WASHINGTON

STEVENS CLINIC HOSPITAL
WELCH, WEST VIRGINIA

EDGERTON MEMORIAL HOSPITAL
EDGERTON, WISCONSIN

WISCONSIN POWER & LIGHT CO.
FOND DU LAC, WISCONSIN

CENTRAL CHEESE COMPANY
MARSHFIELD, WISCONSIN

CH SALES CORPORATION • 427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS
C COAST: 11401 W. PICO BLVD., LOS ANGELES 64, CAL.
EAST: 3651 CONNECTICUT AVENUE, YOUNGSTOWN, OHIO
HWEST: 1227 SLOCUM STREET, DALLAS 7, TEXAS
SOUTHEAST: 5126 SOUTH LOIS ST., TAMPA 11, FLORIDA

nufacturers of telephones, switchboards and related apparatus since 1907

TELEPHONE ENGINEER & MANAGEMEN

1961 Telephone Industry FO

This Forecast Edition will be another "First" for TE&M and the Telephone Industry. TE&M's writers and research department will look at 1960 in terms of growth, earnings, technological advances, significant trends in legislation, regulation, labor, operating costs, financing, etc. and Will FORECAST for 1961 . . .

Advertising Reservations now being accepted

A Valuable Reference Book For Telephone Operating Men and Manufacturers of Telephone Equipment and Supplies

Here's just a sampling of exclusive featu which will be included — "Comparative S tistics between the Bell System & Independ Segments on Over-All Growth — Statis Plant Investment, Revenues and Earning "1961 and The New Look in Telephone Plan "New Measurements for Traffic in 196 "Washington and the Telephone Industry '61" — just to mention a few.

Tables—Charts—Statistics

TE&M's exclusive "Telephone Industry Fo cast" will also present tables, charts, statis and articles that will tell where the indus has been, where it is today, and where i going. It is being designed to be an invalua reference book for both Telephone operat people and the suppliers of telephone eq ment and supplies.

nnounces another important "FIRST"

FORECAST EDITION... JAN. 15, 1961

Outstanding Editorial Staff

e FORECAST EDITION is being planned and com-ed by the following outstanding writers of the telephone ustry . . . all of them regulars on Telephone Engineer Management's editorial staff.

n G. Reynolds ..... Editor
Veteran Author & Telephone Trade Publication Editor

n S. Reed ..... Technical Editor
Engineer, Lincoln Telephone & Telegraph Co., Lincoln, Nebraska

n R. Stacey ..... Commercial Dept. Editor
General Mgr., Sunland-Tujunga Telephone Co., Sunland, California

A. Perigo ..... Traffic Dept. Editor
General Traffic Supt., West Coast Tel. Co., Everett, Wash.

M. Jones ..... Accounting Dept. Editor
Accounting & Financial Admin., Michigan State University

nd Davies & Fred Henck ..... Washington Editors
Editors of "Telecommunications Reports," Washington, D. C.

Corman ..... Small Company Editor
Manager, Southland Telephone Co., Atmore, Alabama

G. Sands ..... Electronics Notebook
Communications Consultant & Author

D. Ehinger ..... Sub-Harmonics & Overtones
President, Citizens Telephone Co., Decatur, Indiana

e A. Gritten ..... Industry Observations
Prominent in telephone affairs for over 57 years.

Other SPECIAL ISSUES for 1961

ng Construction & Maintenance Issue ..... April 15
CATALOG DIRECTORY of Industry Suppliers, May 15
phone Marketing Issue (Another "First"), ... July 15
Construction & Maintenance Issue ..... Sept. 15
Convention No., Oct 1—Convention Report Oct. 15

Order Extra Copies NOW!

Demands for this unusual issue will be heavy. If you will wish extra copies they should be ordered now. Let us know on the Order Form below the number to save for you at the regular rate of 50¢ per copy.

YOUR OWN INDIVIDUAL COPY

If you depend on a copy being routed to you by someone else in your office you might be disappointed. Why not order your own individual copy sent to your home or office on the 1st and 15th of every month (24 big issues each year) for only $4.00. Use the Order Form below.

ORDER FORM

Telephone Engineer & Management
7720 Sheridan Road
Chicago 26, Illinois **1960**

EXTRA COPIES ORDER

Please reserve and send ..... copies of The Telephone Industry FORECAST Edition of Telephone Engineer & Management, Jan. 15, 1961 issue, at the regular rate of 50¢ each.

SUBSCRIPTION ORDER FORM

Please enter my subscription to Telephone Engineer & Management for one year, 24 issues, at $4 per year.

.....Enclosed find check. .....Bill me.

Name ..... **Title** .....

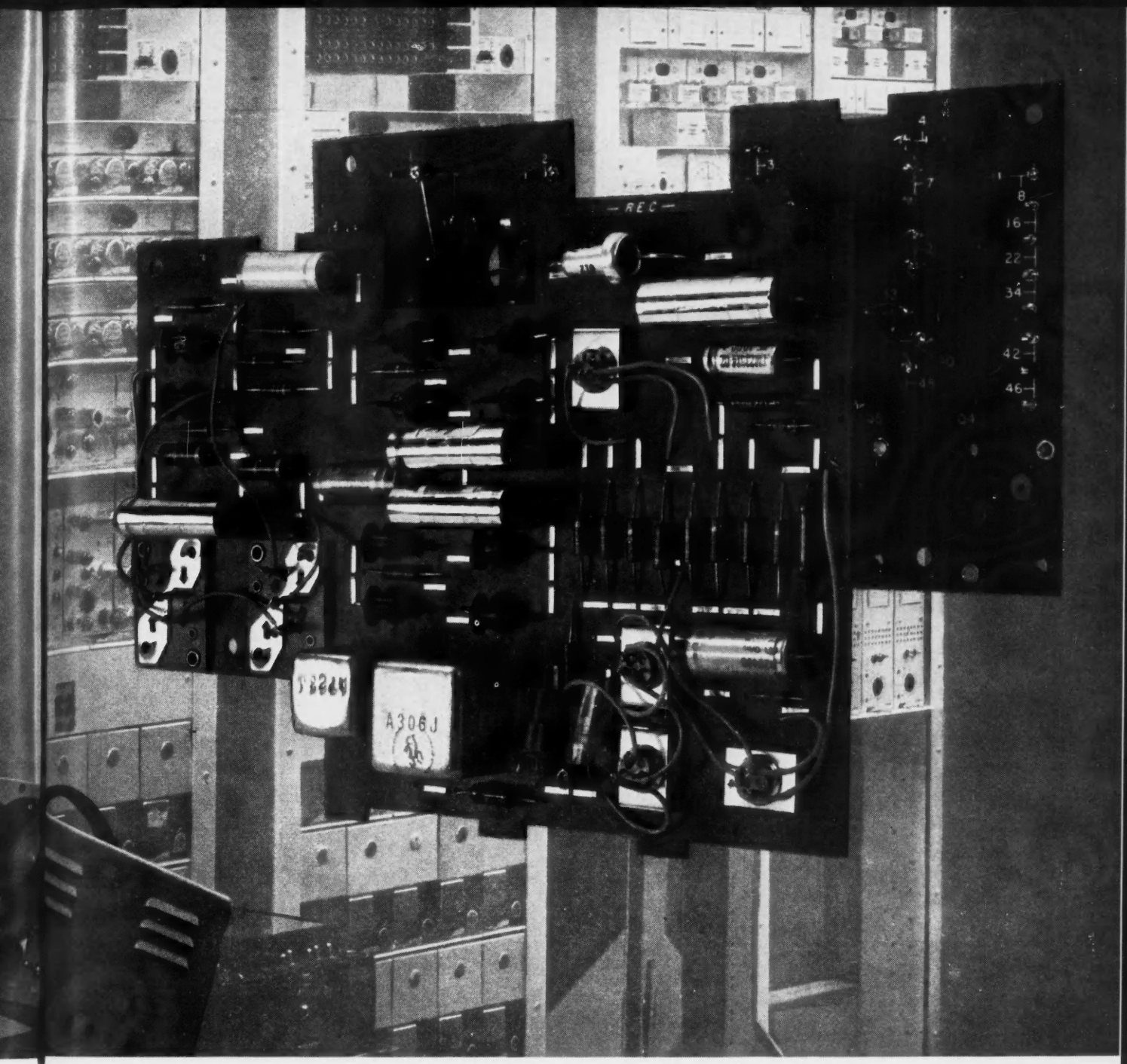
Company .....

Mailing address .....

New "stitched wiring" in *Lenkurt*

What you see above is "stitched wiring," another development to *protect your investment* in Lenkurt equipment. For users of Lenkurt's high-speed telegraph, telemetering, remote-control, and digital transmission systems it combines all the advantages of conventional hand-wiring with the best features of "printed circuits"!

With this revolutionary process, tin-coated bronze staples are automatically inserted at appropriate locations in the mounting board. Components, supported by rigid leads, are inserted through adjacent holes. Each staple then becomes the termination for one or more nearby components and for bare-wire connections to other such



Datatel protects your investment

terminations. All component leads and connecting wires are then machine-wrapped around the staple ends, and the whole unit can be completely tested *before* the final step of dip-soldering.

Front and back of a typical semi-flexible board are shown above. Note that the space-saving advantages of compact card-type construction are not lost . . . yet every component is readily accessible for inspection, test, or even field replacement.

"Stitched wiring" is a feature of Lenkurt's Datatel and other new transmission systems. It's typical of the advances in carrier and microwave engineering that safeguard your investment in Lenkurt equipment.

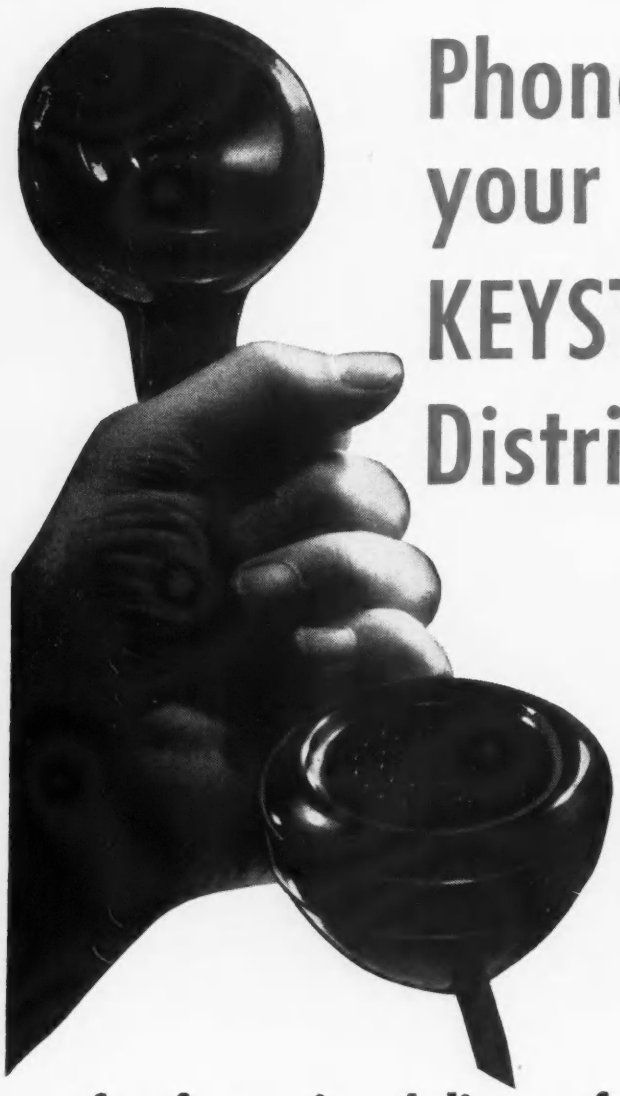
For complete information about Lenkurt products and services, call or write your nearest Automatic Electric representative, or the Director, Carrier & Radio Sales, Automatic Electric Sales Corporation, Northlake, Illinois.

AUTOMATIC ELECTRIC

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM



Phone your KEYSTONE Distributor

British Ropes Canadian Fact., Ltd.
Vancouver, B. C., Canada

Crescent Electric Supply Company
Burlington, Iowa
Dubuque, Iowa
Cedar Rapids, Iowa
Davenport, Iowa
Madison, Wisconsin
Mason City, Iowa
Ottumwa, Iowa
Peoria, Illinois
Quincy, Illinois
Rapid City, South Dakota
Sioux City, Iowa
Sioux Falls, South Dakota
Spencer, Iowa
Sterling, Illinois
Waterloo, Iowa

Dakota Electric Supply Co.
Fargo, North Dakota

Joslyn Mfg. and Supply Co.
Birmingham, Alabama
Chicago, Illinois
Dallas, Texas
New Orleans, Louisiana
New York, New York
No. Kansas City, Missouri
Oklahoma City, Oklahoma
Omaha, Nebraska
St. Paul, Minnesota

Kingsport Electric Co., Inc.
Kingsport, Tennessee

Line Material Industries
Milwaukee 1, Wisconsin

Marshall-Wells Canadian Companies, Ltd.
Winnipeg, Manitoba, Canada

The Mine & Smelter Supply Co.
Salt Lake City, Utah

Nelson Electric Supply Co.
Dallas, Texas
Lubbock, Texas

Jack Pruzan Co.
Seattle, Washington

Southern Electrical Corp.
Chattanooga, Tennessee

Suttle Equipment Company
Chicago, Illinois
Lawrenceville, Illinois

Tele-wire Supply Co., Inc.
Jamaica, New York

Tennessee Valley Electric Supply Co.
Nashville, Tennessee
Memphis, Tennessee
Little Rock, Arkansas

Wheeler Lumber Bridge & Supply Co.
Norfolk, Nebraska

...for fast wire delivery from stock

When wire is needed, call your Keystone Wire Distributor. His stocks are well supplied. He can give you prompt delivery in any emergency.

Keystone Telephone Wire is available in a full range of Class A line wire in 50M, 85M, and 135M tensile strengths, and meets the specifications of A.S.T.M., A.T.&T. and is approved by R.E.A. Galvanized bond, tie and construction wire are also available at your Keystone Distributor.

A phone call will bring you fast delivery . . . contact your Keystone Distributor for your next wire need!

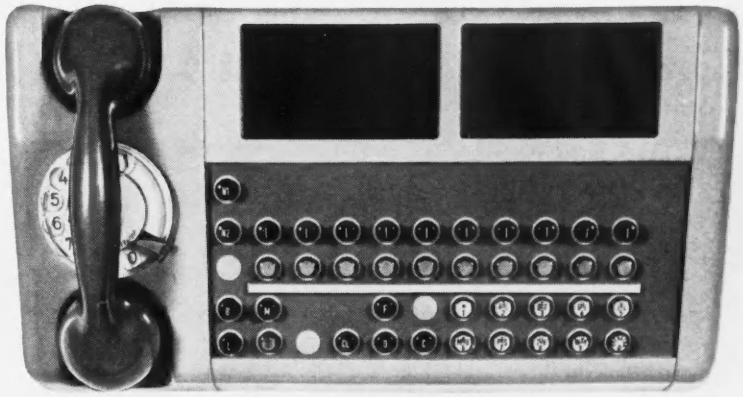
KEYSTONE STEEL & WIRE COMPANY, Peoria 7, Illinois

KEYSTONE
Wire for the Telephone Industry

. . . by the makers of famous Red Brand Fence

IN BRIEF...

ALL YOUR COMMERCIAL SUBSCRIBER NEEDS AND SPECIAL REQUIREMENTS PACKAGED IN A DESK TOP CABINET—NO LARGER THAN A BRIEF CASE...



TYPE 30 PBX BY USI

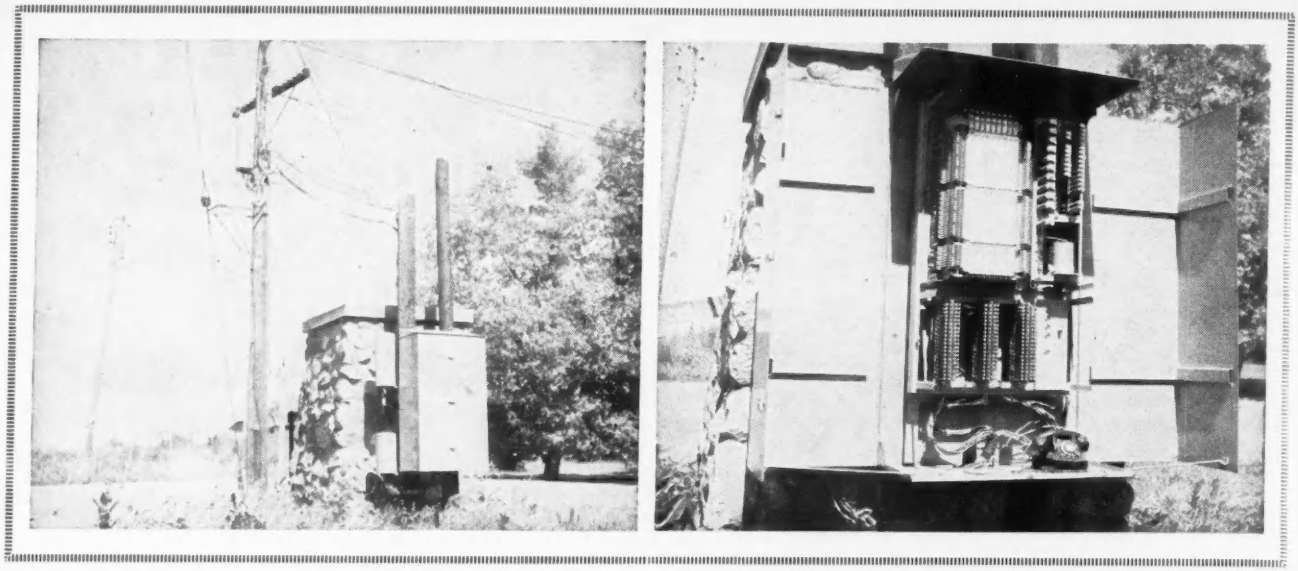
Truly an automatic system that frees the PBX operator for other duties

For information about this modern communications system, call or write Sales Department.

U S CORP.®

UNITED STATES INSTRUMENT CORP.

CHARLOTTESVILLE, VIRGINIA



The Economies of Line Concentrators

By ROBERT C. HUNT*

Line concentrators are becoming popular because of (1) the need to increase efficiency of the outside plant, and (2) the fact that not all subscribers use their telephones at the same time.

WHEN I was asked by a member of the USITA Plant Committee to prepare and present this paper on Line Concentrators I asked him what he thought my qualifications were and his answer was that since we had two of these units in service perhaps I could pass on to you our experiences concerning them. It is with this knowledge that I appear before you today. Our experience, while limited, may be of benefit to you and I will try to outline the situations and events that prompted our decision to buy and install these units.

In the last several years telephone manufacturers have been offering for sale to the Independent telephone industry devices known as Line Concentrators. These devices offer many advantages to the user provided they are used in the right way at the right place. This paper will be concerned mainly with the economics of such devices, giving examples of their correct use, examples where they should not be used, and will touch briefly on the mechanics of such devices.

Line Concentrators, for those of you who are unfamiliar with these units, are relay devices, usually in the form of a large crossbar switch which permits the rapid switching of a subscriber line to a traffic talking trunk to the central office. Concentrators are used in pairs, one placed some distance from the central office where additional cable facilities are needed and the other in the central office. These usually are called the "Subscriber Unit" and the "Central Office Unit" respectively. The two units are in effect mirror images of each other, each performing a simultaneous and identical switching operation. Line Concentrators have come into being because of the need to increase the efficiency of outside telephone plant and because of the statistical fact that not all of the people use their telephones all at the same time.

Consider the following example: A 15-pair cable terminal at the fringe of a growing community is serving ten 1-party lines and five 2-party lines for a total of 20 subscribers. Additional houses are planned for the area. Before the advent of Line Concentrators the only alternatives available to the telephone company were to provide permanent additional cable, or to string urban or rural distribution cable back to where pairs were available

*Mr. Hunt, general manager, Blair (Neb.) Tel. Co., presented this paper at USITA's 1960 Plant Conference.

or to degrade the service by changing some of the lines already in service to 4-party service.

This situation is not unique. In the growing America of today it is becoming the rule rather than the exception. Until the time of Line Concentrators, cable pairs had to be provided in some manner all of the way back to the central office.

In the above example let's assume that it is two miles to the office. Now the problem begins to assume some rather large proportions. Since the average residential line is in use something less than 5 per cent of the minutes in a day, a little figuring shows that we have a cable pair lying in the ground or hanging in the air ready to serve 95 per cent of the time, but actually doing nothing in the way of providing telephone service.

If some way could be found to switch this pair around to various subscribers in the area when they desired service much of this 95 per cent of idle time could be used by other subscribers. Line Concentrators perform this switching job and are available in sizes as small as nine talking trunks and 19 lines, to as large as 20 talking trunks and 100 lines.

Terminal Capacity Expanded

LET'S get back to our 15-pair cable terminal that was full and was serving 20 subscribers. Using one of the Line Concentrators that are available today, we can expand the capacity of this terminal in the following manner. Assuming we expect a substantial growth in the area we will purchase and install a 9-trunk, 49-line unit. To operate this unit we need 11 pairs, nine pairs for talking trunks and two pairs for switching control. This leaves us four pairs in the terminal for direct service. How this terminal would appear after installation of a concentrator is as follows.

Pairs	Usage	Lines	Subs.
4	2-party, direct	4	8
2	Control	—	—
9	Talking Trunks	49	63
15	Total Subs Served		71

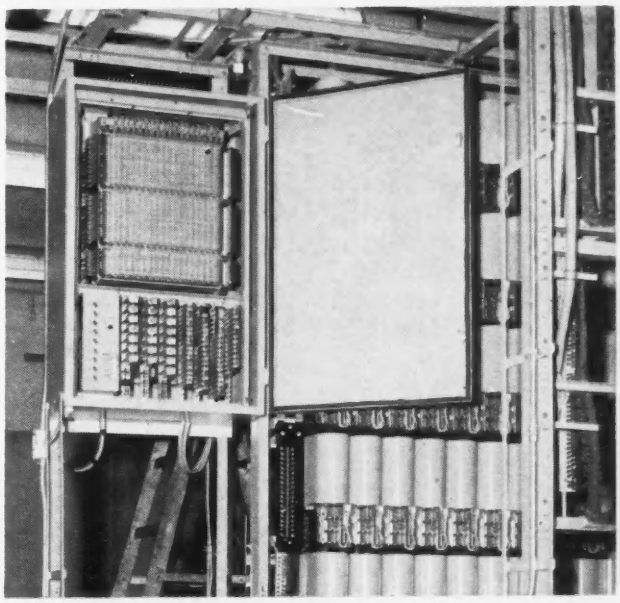
Here we had a 15-pair terminal serving 20 subscribers and now it is capable of serving 71. This terminal is now serving 355 per cent of the subscribers that it did formerly and we were able to do it without the necessity of constructing pairs two miles back to the central office.

All of us here are exposed to the methods of American advertising. When a gasoline company offers a fuel that will boost gas mileage in your car 6% it is shouted to the house tops. When a salesman for some type of office equipment can show you how to save 20 per cent on the cost of doing an accounting job he shouts it to the house tops. Now when we have available to our industry a device that boosts efficiency of cable pairs more than 300 per cent it certainly behooves us to take a good look at this thing. It probably is the one single device in the telephone industry that increases efficiency of our outside urban plant more than any other that is available today.

When one considers that units are available in sizes to 100 lines that operate over 22 cable pairs we can see that efficiency gains in the order of 450 per cent are possible. Here is something too big to be dismissed as "just another gadget." A closer look, and a little figuring on the part of all telephone people is in order. This gain in cable pair efficiency is not without the expenditure of dollars but when these units are correctly used the cost can be small compared to the service that the units can provide.

Situation #1

LOCATED one and one-half miles from the central office of my home town, Blair, Neb., is Dana College, a small, church-supported, Liberal Arts institution. This college has been there for 76 years and currently has an enrollment of about 300 students. When our buried cable plant was installed in 1926 this area was served by a 25-pair cable terminal. Since the college is outside of the city limits this terminal also serves 11 rural lines. For many years past the terminal had sufficient capacity to provide the services desired in the area.



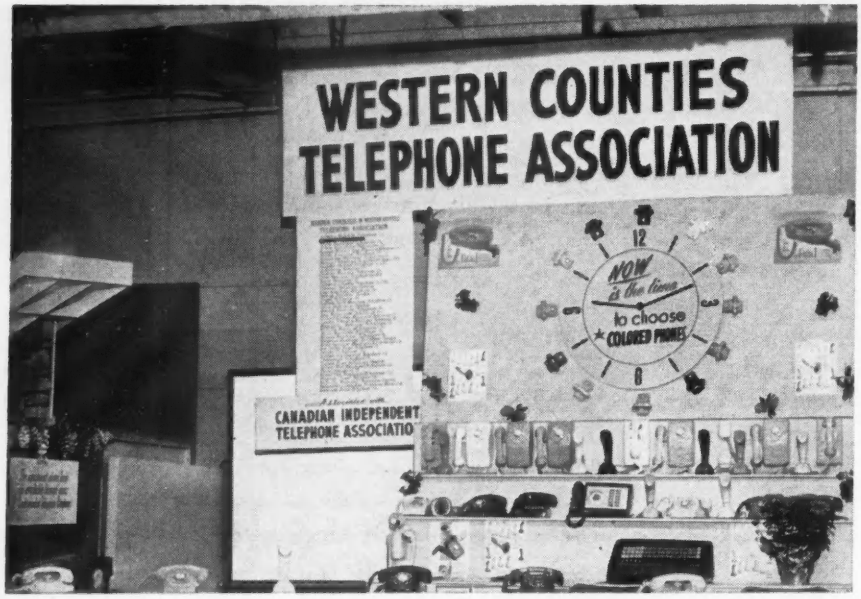
A typical rack installation of the central office unit of a line concentrator in a step-by-step office.

With the recent emphasis placed on education the college has begun to expand. This expansion has taken the form of new dormitories, classroom buildings, Libraries and Administration buildings. Any expansion also has to be accompanied by an increase in personnel. The area has gradually built up with many new homes and the area was recently incorporated in the city limits of Blair.

You can guess the results of this expansion on the service. While I'm not proud to admit it we had to offer only 4-party service to new homes and a five-pair aerial cable was temporarily back-strung seven-tenths of a mile to get some additional pairs.

It appeared that a new 50-pair cable should be installed in the area but to get it would require that we

Please turn to page 76


WESTERN COUNTIES
TELEPHONE ASSOCIATION
NOW is the time to choose COLORED PHONES
CANADIAN INDEPENDENT TELEPHONE ASSOCIATIO

Western Counties (Canada) Telephone Association booth at Western Fair held in London, Ontario, Canada, featured colored telephones with a color for each hour on the clock. Other attractions featured the Petite set, Princess set, Ericofon, Call Director, Key System and small Cordless Switchboard. While the show was in progress a projector flashed on the screen colored pictures of various telephone offices in the area. A tape recorder provided background music with a commercial on the Independent telephone industry between each selection.

Traffic Looks At Person, Collect & Special DDD

By JOHN B. NOGGLE*

Premium DDD extends Commercial services and Accounting efficiency to the heavy users of higher rated toll, and to consumers who require essential telephone services.

DURING the past decade we have become familiar with the service improvement and operating economies accomplished with DDD automation. It is significant, however, that until 1958 DDD systems could only handle station-to-station sent-paid traffic. This year several of our manufacturers have systems which will handle Person, Collect and Special Service DDD and the purpose of my talk is to discuss the importance of this development to our service and operating efficiency.

We offer two rates of toll service, station-to-station and person-to-person, to our coin and non-coin customers. We also provide five methods for these calls to be billed: Paid, Collect, Credit Card, Third Station Charged Calls and Special Reversed Toll or Enterprise Calls. In addition, we furnish essential special services by accepting Time, Charge and notify requests and through our delayed procedures.

Person, Collect and Special Services on DDD, as we know it today, admit to the customer dialing from non-coin telephones of station and person traffic. It permits messages to be billed as paid, collect, credit card or third station charged calls. Some systems can handle time, charge and notify requests. There also exists some coin telephone limited toll dialing. None are arranged at present for enterprise, or "WH," traffic.

For the past two years I have been intimate with person, collect and special services on DDD. I prefer to call it Premium DDD, and will throughout this talk, because operator work is premium work and all these calls, with the exception of station-to-station sent-paid calls, require operator work for their completion.

A premium system adds to Station DDD equipment the means for operator control of the class of service, call announcement, and start of conversation timing. I have knowledge of three different systems which are fundamentally the same though they differ in arrange-

**Mr. Noggle, division traffic manager, Virginia Tel. & Tel. Co., Charlottesville, Va., presented this paper at USITA's 1960 Traffic Conference.*

ment and may vary in manipulation. The sequence of advancing a call is common to all the systems so let us review an inter-state, person-to-person, sent-paid call from the standpoint of the customer, the operator and the DDD equipment.

After receiving dial tone our customer dials an access code which will connect him to the DDD equipment; he will then dial a Premium code of one digit which is a signal to the equipment that a control operator is required to classify and announce the call and start the conversation timing; next he dials ten digits consisting of the three digit Numbering Plan Area code, the three digit distant central office code and the four digits of the called telephone number.

When he completes dialing, the equipment advances a line signal to the operator and, upon her answer, our customer would hear a triple order tone. This is his signal that the operator is on the line and awaits his special instructions on the call. Our customer immediately passes his instruction, "I want to speak with Mr. Jones."

Toll line sending started when the operator answered the line signal and after a brief interval ringing would start at the distant station and an answer would be obtained. The operator would announce, "I have a long distance call for Mr. Jones." When Mr. Jones acknowledged he was on the line, and conversation started, the operator would leave the circuit.

Processing The Call

WHAT WORK has our operator done in processing this call? When she received the line signal she knew the call would be advanced over the toll line automatically upon her answer. As soon as she received the instructions that her party wanted to speak to Mr. Jones she knew it was a person-to-person call and operated a key to mark this class in the equipment. When conversation started she operated a start-timing key and left the connection.

The equipment functions are the same as found in Station DDD with three exceptions. The exceptions are the recognition of the Premium Code digit for operator control assistance, operator classification of the call and operator actuation for start of conversation timing. The ticketing equipment received and stored the calling telephone number, the called area code, the called central office code, the called number, the class of call, and accumulated the minutes of conversation after start of timing. This equipment also obtained instructions from a routing translator, selected the proper trunk and spilled forward the required digits. At the end of conversation the stored information was transferred to a physical record and another associated unit at that time provided the time of day and the date. The end result is a record that contains all the information required to rate and bill this person-to-person toll message.

Collect calls are handled in the same manner as our person-to-person sent-paid example.

Credit Card and Third Station Charged calls require the control operator to record the called number, the number designated for billing, the time, and date upon a memorandum ticket which is forwarded to the Accounting Department. The operator marks a special classification on the DDD message so the Accounting Department may isolate the machine message and associate it with the corresponding memorandum ticket to complete the information required for billing.

It is difficult to advise you what to expect in a Premium DDD system. Following is a list of features, existing or planned, in the systems I have seen. I do not

believe any single system now contains all of these following features.

(1) *Recorder Line Lamp and/or Call Waiting Lamp*: — To signal the operator that a DDD call is awaiting disposition.

(2) *Recorder Busy Lamp*: — Required when operators have access to recorders.

(3) *Through Supervision to Calling Number.*

(4) *Calling Number Display*: — A visual indication to the operator of the calling telephone number stored in the recorder.

(5) *Calling Number Delete*: — A means to delete the calling telephone number in the recorder.

(6) *Calling Number Re-entry*: — A means to reinsert a corrected, or different, calling telephone number.

(7) *Calling Number Control*: — A means whereby the operator controls the calling line as long as she is in on the connection.

(8) *Ringback*: — A means for the operator to ringback the calling party if he leaves the line.

(9) *Through Supervision to Called Number.*

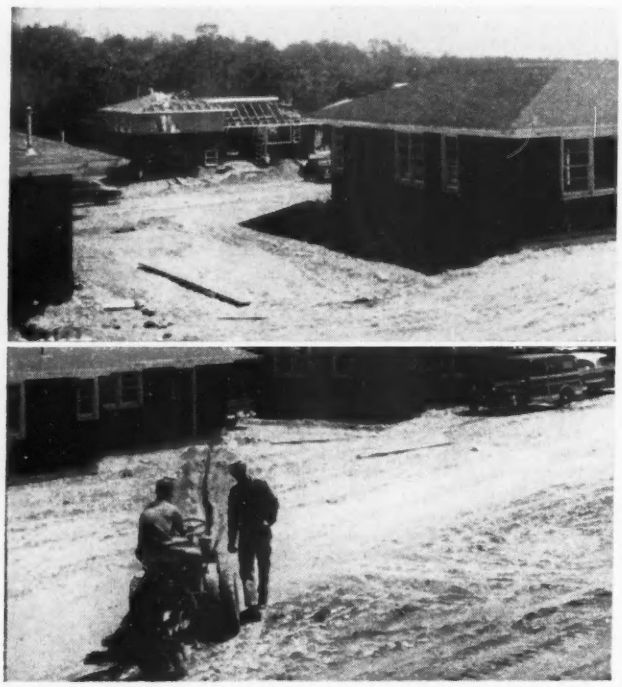
(10) *Called Number Display*: — A visual indication to the operator of the called numbers dialed into the equipment.

(11) *Called Number Delete*: — A means to delete a called number.

Please turn to page 74

The Imperatives of Public Service

By DANIEL B. CORMAN*



OUR INDUSTRY has an obligation to provide acceptable service to the widest practicable number of applicants. REA has defined that obligation as area coverage service. Sometimes the question arises, "What is area coverage?" The answer is service to all applicants who are able and willing to pay a rate for the desired services which justifies the telephone utility to install and maintain the necessary facilities to provide good service.

After the end of World War II the demand for telephone service in both rural and urban areas was greatly accelerated. All telephone utilities were faced with tremendous problems in their efforts to meet these unprecedented demands. Most small companies were unable to get adequate financing through the usual commercial channels. This problem came to the attention of the

Mr. Corman, general manager of the South Central Rural Telephone Cooperative Corp., Inc., Glasgow, Ky., presented this address at USITA's 1960 REA Borrowers' Conference.

Congress of the United States. The matter was discussed in both houses of Congress for quite some time and in October 1949 the Congress enacted an amendment to the Rural Electrification Act of 1936 authorizing the REA to make loans to telephone companies and cooperatives for rural telephone development.

The interest rate was set by statute at two per cent per annum. This law made no stipulation with respect to the equity requirements of borrowers. However, it did require the administrator of REA to make a certification that he believed the loan to be sound and that it would be repaid in full as to principal and interest according to the terms of the loan contract. In order to meet these requirements, the administrator set up certain loan security regulations among which was an equity ranging up to 50 per cent and a first mortgage on all of the property of the borrower. In actual practice most loans have been made on equity requirements of much less than 50 per cent.

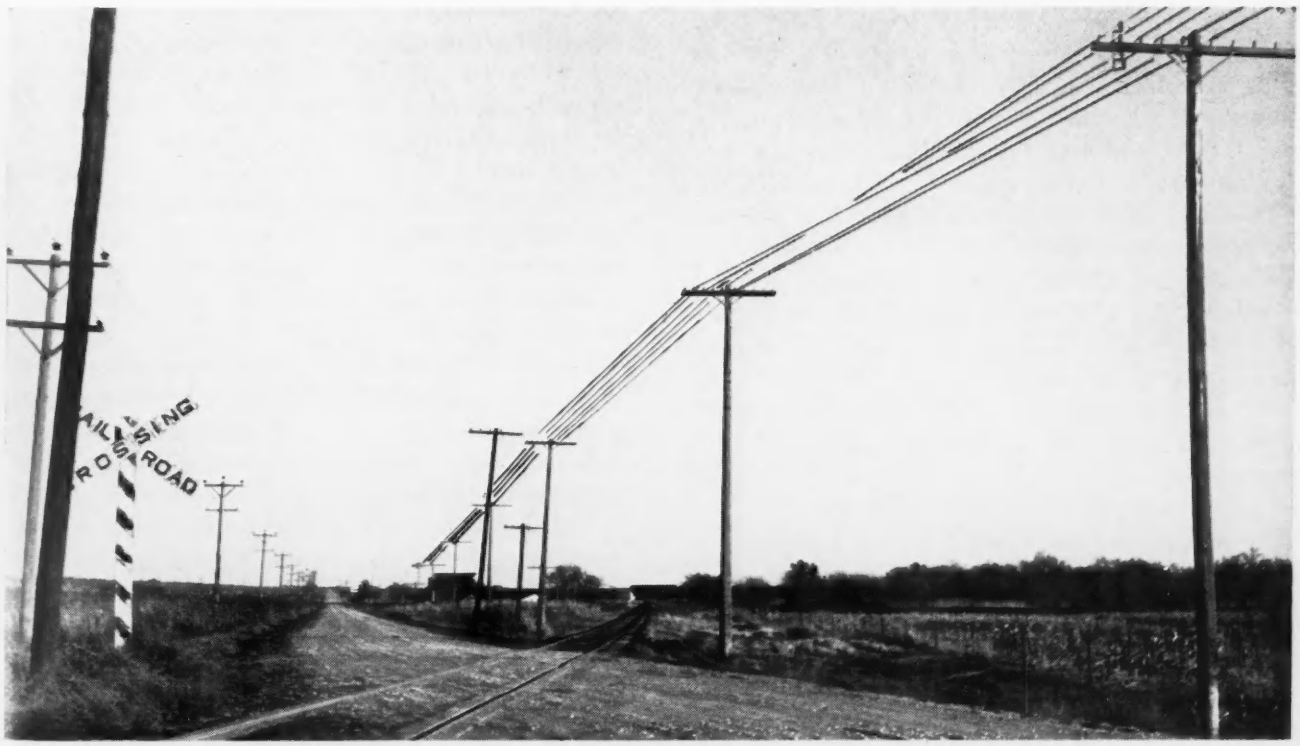
The question sometimes arises, "Is it sound business practice to have a financial structure consisting of more than 50 per cent debt capital?" Insofar as the loans by such commercial establishments as insurance companies and trust funds are concerned, I believe that the answer is no. However, where the source of capital is provided by a government agency such as REA which has a competent staff to supervise the loans, we believe there is ample evidence to justify the practice of using a very high percentage of debt capital.

REA made its first telephone loan in 1950. Through June 30, 1960 the Congress had authorized loan funds to REA in the approximate amount of 679 million dollars. During the same period REA has approved loans to borrowers in approximately the same amount. Loan funds have been advanced to borrowers in the amount of $501,262,035.00. These loans have been made to 705 borrowers of which 211 are cooperatives and 494 are commercial companies. Eighty-nine of the cooperative borrowers have made advance payments amounting to $1,867,437.00 and 82 commercial companies have made advance payments amounting to $1,408,265.00 totaling advance payments of $3,275,702.00. Twelve borrowers are delinquent in payments of principal and interest for 30 days or more. Nine of these delinquent borrowers are cooperatives and three are commercial companies. The total amount delinquent is $285,384.00 in principal and $30,424.00 in interest. The fact that this small percentage of borrowers is delinquent does not necessarily signify that the loans have soured. None are in a serious enough condition to justify foreclosure. To me this seems to be a good record.

The loans which have been made to the 207 borrowers are estimated to finance the construction of 356,581 route miles of pole line and to serve 1,371,791 subscribers of which 617,516 will receive service for the first time. Literally thousands of exchanges have been converted to dial operation and are providing adequate modern telephone service to their communities. Most of these accomplishments could not have been reached without the assistance of the REA telephone loan program.

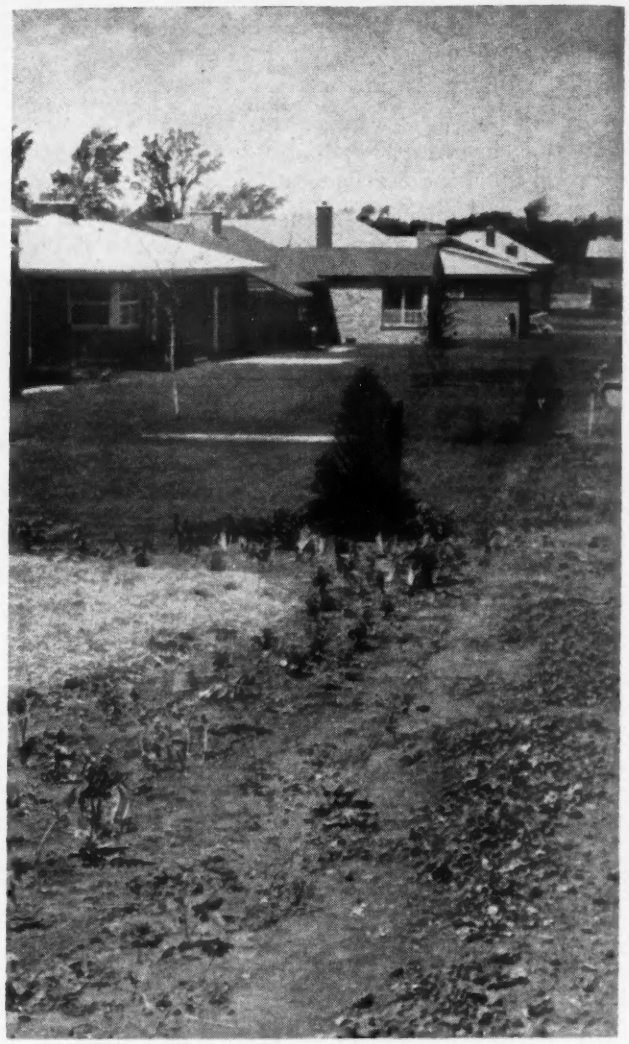
No one in the telephone business expects an insurance company or trust fund to make a loan totaling more than 60 per cent of the required capital assets.

Please turn to page 70



Recent and Possible Future Changes In Telephone Accounting

By D. F. MacEachern*



SEVERAL people have talked and written about the almost incomprehensible changes that have occurred during the lifetimes of most of us. Some of the most dramatic of these changes have occurred in our business within our own memories: telephone conversations across the continent beginning in 1915, across the Atlantic beginning in 1927, and now conversations bounced off satellites and even the moon; also, the advent of microwave radio relay, deep sea voice circuit cables, station and switching developments.

While all this has been going on there have been relatively few changes in the Uniform System of Accounts, partly because the system was broadly designed in the first place, and partly because all concerned have made the system fit new developments wherever possible, even if that sometimes required a little squeezing, such as classifying large microwave towers as buildings.

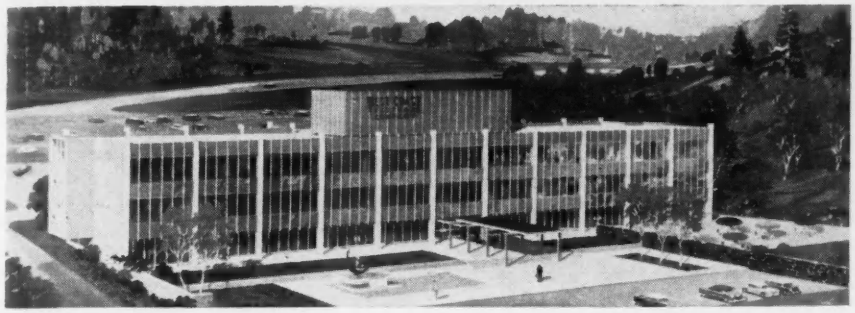
Of course, when really necessary, the system has been amended. That was the case in 1957 when the new station accounting was promulgated. Several years prior to that, the N.A.R.U.C. had asked the telephone industry its views on "meter" accounting for telephone sets and depreciation accounting for station installations and drop and block wires. At first it seemed that the disadvantages outweighed the advantages, but there was a tremendous potential in eliminating clerical work, particularly on the part of the craftsmen.

Accordingly, a special task force was established at A. T. & T. headquarters, composed of accountants, engineers, and plant administrators. This force and your accounting and engineering committees jointly developed the basic concepts of the revised station accounting. Thus it was possible to present to the F.C.C. a mutually satisfactory industry proposal, which was subsequently prescribed to become effective optionally on January 1, 1957 or January 1, 1958.

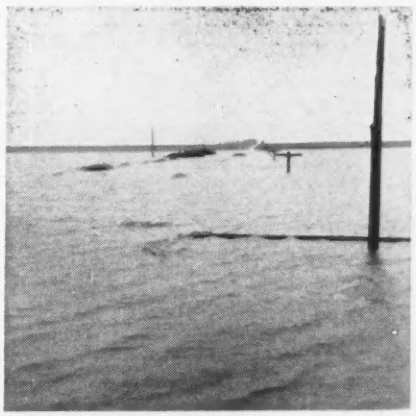
As a result of these revised rules we have been able to make considerable savings in clerical work and, in addition, we believe that we are getting a much better accounting answer. Presumably the new accounting has been pretty well shaken down in your companies by now, so we need not dwell on this.

The task force established for station accounting was succeeded for a time by another task force which studied general reform of our accounting processes. Some of the survivors of those forces now constitute a group in my organization. Its members, along with our engineering and other people, have been looking into other areas of accounting, reporting, or recording practices where substantial clerical savings and further simplification may be achieved. Certain of their recommendations require changes in the accounting rules, particularly for the Class A and B companies. Their overall objective is to simplify the record keeping job and to reduce paper

Mr. MacEachern, chief accountant of the American Telephone & Telegraph Co., New York City, presented this paper at USITA's 1960 Accounting Conference.



West Coast Telephone Company recently began construction of this three-story and part-basement building in Everett, Washington to house the firm's general offices. General contractor for the near $2 million structure is the John H. Sellen Company of Seattle. Special features of the new office unit will include a large employe cafeteria with outdoor dining area, full landscaped seven-acre site and parking facilities for approximately 120 vehicles.



"Who Says It Doesn't Rain In West Texas?"

C. H. MEANS, manager of the South Plains Telephone Co-op, Lubbock, Texas, submits these photos to prove that West Texas does get rain — 14 inches in a 72-hour period. Office personnel and plant men of the South Plains Telephone Co-op promptly restored service after the interruption caused by the downpour.

"Transmitter" Editor Picks A Winner

"Wherever we visit," George Forbes, editor of the "Stromberg-Carlson Transmitter," was saying to Lockwood Working of the Michigan Bell Co.'s Hastings office, "we are looking for something that's a little out of the ordinary."

"For instance, is there any special significance to the party at the next table?" asked Mrs. Forbes.

"They tell me that 'Miss Michigan' is in town," replied Mr. Working, "Perhaps that's it, I'll find out."

The sequel to the story was seen by thousands glued to their television screens on Sept. 10 as NANCY ANNE FLEMING (shown above) was chosen "Miss America" for 1961. Among these thousands were the Forbes family, silently pulling for the charming girl who, in spite of a grueling schedule, had graciously consented to a snapshot by the traveling editor.

work without disturbing the overall integrity of the accounts.

Your cooperation and assistance have already advanced the industry's progress in this continuing battle against paper work. We deeply appreciate your help in this field and look forward to a continuation of working together in presenting an industry-wide approach to our accounting problems. In this way recommendations can be made for changes that are mutually acceptable to all companies in the industry, regardless of their size.

Some of the recently effective changes based on the recommendations of the task force and others are:

(1) Elimination of Account 207 Right of Way. This account has always been a nuisance and was difficult to administer.

You will recall that under the accounting previously in effect, the cost of permits to locate poles, cable, wire and conduit was included in Account 207 when the expected period of occupancy under such permits exceeded the estimated life of the initial plant. However, the cost of the permits was included in the account appropriate for the cost of the property constructed when the expected period of occupancy did not exceed the estimated life of the initial plant, and when the permits were for placing cable and wire on buildings and fences, regardless of the expected period of occupancy.

Rights in land used for buildings, similar to those classifiable as Right of Way if acquired for outside plant, were classifiable as Land.

Thus, under the previous accounting, costs of a right of way nature might be includible in Account 207, Account 211 Land, or the account appropriate for the property constructed, depending on the circumstances.

The previous accounting was based on the theory that most rights of way have lives of their own which exceed the lives of the physical units placed on those rights of way, but in practice the actually experienced life tends to be shorter than the prospective life because additional right of way costs are frequently incurred when replacing plant is constructed, regardless of strict legal requirements.

The new accounting treats the costs of right of way, other than land in fee, as a part of the cost of the physical plant, just as the initial survey and engineering cost and the cost of the initial holes for the poles are treated. This is consistent with the view that each generation of physical items within a given plant class should bear the actual costs incurred for such generation of items.

Next page, please

"Telephone Accounting"

(Continued from page 33)

The elimination of Account 207 for Class A and B companies was made effective January 1, 1960 in our companies and has made the accounting and reporting work simpler and less costly. It has obviated having to decide for classification purposes whether the period of occupancy under permit obtained for locating outside plant is expected to exceed the life of the initial physical plant. All of the record keeping and accounting work involved in keeping a separate account for right of way, such as maintaining continuing property records, developing and maintaining retirement unit costs, and making retirement entries, has been eliminated.

USITA Accounting Conference Speaker, D. F. MacEACHERN, chief accountant, A T & T Co., New York City.

(2) Elimination of Account 602.9 General Supervision, Engineering and Tool Expenses. Under the previous accounting prescribed for Class A companies, the costs of general supervision, engineering and tool expense were included in all maintenance expense accounts except in the case of those accounts that relate to the maintenance of outside plant. It seemed desirable for administrative purposes and also advantageous in the accounting processes to include the cost of general plant supervision, engineering and tool expense in the accounts for the related maintenance work performed.

With the elimination of Account 602.9, the cost of maintenance work is now expressed on a basis more consistent with that used for calculating the cost of construction and removal work. This treatment of general plant supervision, engineering and tool expense is also consistent with the treatment of other allocated and indirect costs such as local plant administration, motor vehicle expense, supply expense, and miscellaneous expenses of Plant forces.

However, the elimination of Account 602.9 by itself would have increased the amount of detailed reporting required of engineers under our practices. The requirements for detailed reporting were based on our interpretation of the texts of Account 705 Engineering Expense and Account 706 Plant Supervision Expense in the Uniform System of Accounts. In order to clear the expense on the basis of "the time devoted to particular jobs," it would have been necessary for the engineers to divide the small amount of time spent on minor, routine jobs among the various accounts.

In the case of routine outside plant jobs, it would have been necessary for the engineer to subdivide the time which had previously been classified to Account 602.9 among a number of different maintenance accounts.

However, the burden of this subdivision only pointed up the difficulties of direct assignment of minor amounts of engineering time to individual account codes. The field craftsman classifies his time on the basis of the physical operations performed, but the engineer must translate his time into terms of future activities.

Engineering considerations of an overall nature, supervisory and travel time, the presentation and rejection of alternative plans, the timing and processing of the order and similar broad general engineering effort must be broken down into the many account codes without having a precise means for doing so.

We believe that there is no absolute association of the engineering effort with each of the primary accounts or subaccounts involved in many jobs. The engineers, accordingly, would have had to decide whether to divide their time on a particular routine job on the basis of a broad estimate of the total cost by accounts, on the basis of the amount of the estimated productive labor by accounts, or they would have had to attempt to time and subdivide their mental effort by accounts. None of these methods for reporting engineering time is practical for routine jobs.

It did not seem appropriate for the System of Accounts to prescribe a specific clearance basis since companies differ not only in size and make-up of engineering forces, but are constantly working to develop procedures for work simplification and to produce results that will be more useful from an administrative and regulatory point of view. Therefore, the proposal was made and accepted that the texts of Account 705 Engineering Expense and Account 706 Plant Supervision Expense be modified to permit other equitable bases of clearance where direct apportionment is impracticable.

Pursuant to F.C.C. rule making in March, 1959, which we made effective retroactively to the first of that year, the plant field engineers are now required to report their time for minor or routine jobs to only three categories: construction, removals, and maintenance. Clearances are made from those categories on the basis of time reporting of the related labor forces for a representative period. Although the savings are not substantial, the field engineers have less paper work and we obtain a more consistent distribution of their costs.

(3) Increase in the minimum number of spans of cable and wire constituting a retirement unit.

One way to simplify the record keeping process is to increase the size of retirement units. A step has been taken in this direction with respect to cable and wire. Pursuant to

Supplies! When you need them most

"MOON": Hello, Ed. Glad to hear your voice! We were afraid that hurricane might have you folks in real trouble.

ED: Well, we're in trouble, believe me, right up to our cross-arms, Moon.

"MOON": Sorry to hear it, Ed. What can we do to help?

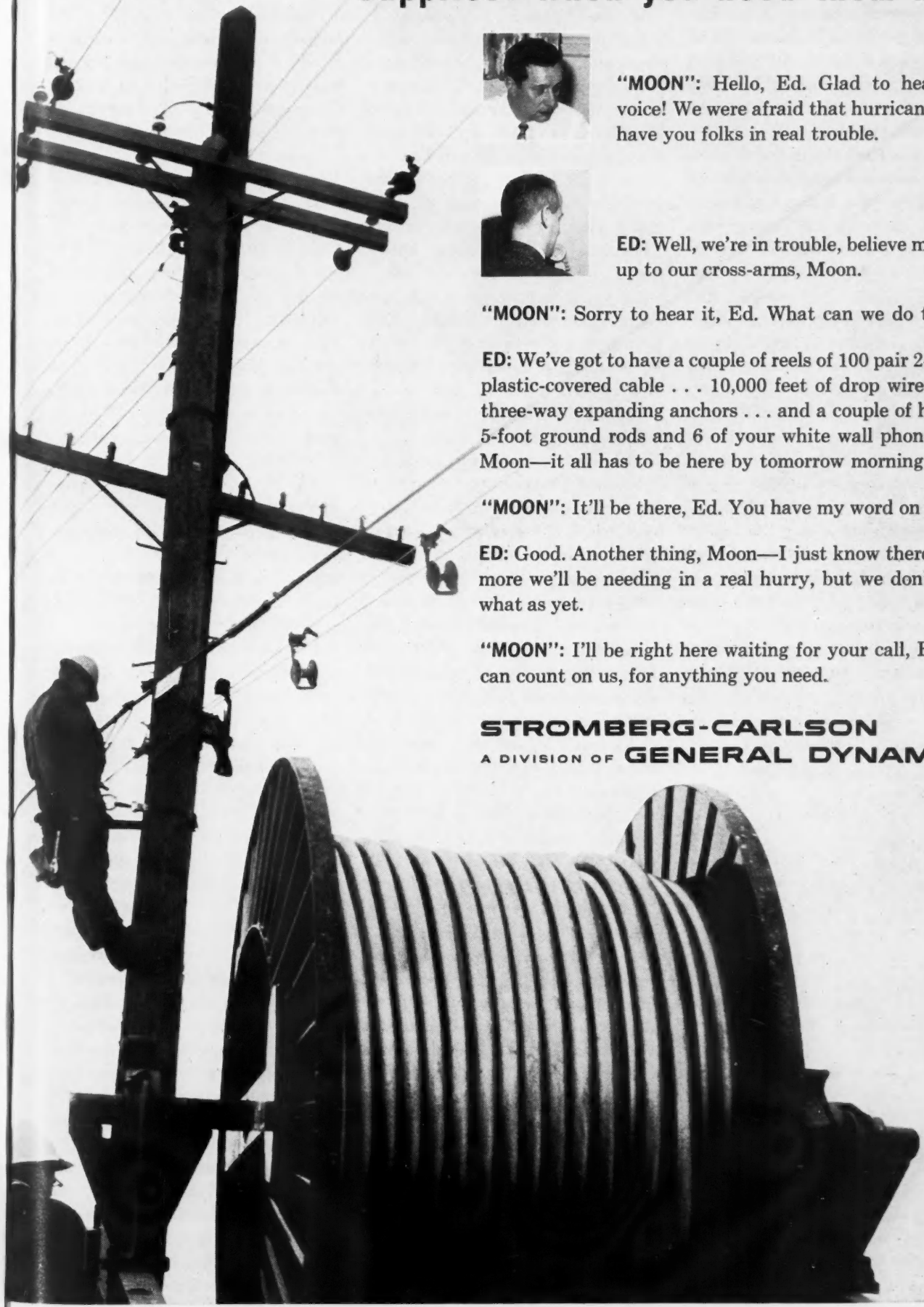
ED: We've got to have a couple of reels of 100 pair 24-gauge plastic-covered cable . . . 10,000 feet of drop wire . . . 50 three-way expanding anchors . . . and a couple of hundred 5-foot ground rods and 6 of your white wall phones. And Moon—it all has to be here by tomorrow morning.

"MOON": It'll be there, Ed. You have my word on it.

ED: Good. Another thing, Moon—I just know there's a lot more we'll be needing in a real hurry, but we don't know what as yet.

"MOON": I'll be right here waiting for your call, Ed. You can count on us, for anything you need.

STROMBERG-CARLSON
A DIVISION OF **GENERAL DYNAMICS**



TLANTA: TRINITY 5-7467; CHICAGO: STATE 2-4235; KANSAS CITY: HARRISON 1-6618; ROCHESTER: HUBBARD 2-2200; SAN FRANCISCO: OXFORD 7-3630.

(Continued from page 34)
rule making, as you know, the F.C.C., in June, 1960, increased the minimum lengths of Aerial Cable and Aerial Wire defined as retirement units from one span to 2 spans for the cable and from 2 spans to 5 spans for the wire. The change applies to Class A, B, and C companies and we intend to make it effective next year.

The increase in the size of the units was advocated so that many small replacement jobs, which are really a part of current plant upkeep, but which are now accounted for as construction and removals, could be accounted for as maintenance, with resulting considerable savings in accounting and other clerical effort.

In the restoration of service after a few feet of cable in a span have been damaged, it is frequently more practical to replace the whole span than to undertake mid-span repairs. When replacing aerial wire because of a break in a span of such wire, it is frequently necessary to replace more than two spans because of damage to the wire at the tie wires in the adjoining spans. We estimated that there are annually somewhere around 15,000 jobs like these in our companies which will move into the maintenance category.

Savings under the new rules are caused partly by the fact that recording and accounting for this work as maintenance will be considerably simpler and less extensive than recording and accounting for it as construction and removals. This is because work accounted for as maintenance does not give rise to retirement entries or to entries on continuing property records, location records and mortality records. Savings also result from the fact that authorizations and field instructions for maintenance work do not need to be as detailed as for work involving construction and removals accounting.

In the process of the related rule making, REA stated that from their point of view the units might be too large and, accordingly, F.C.C. instituted a general rule to provide that retirement units may be subdivided where desirable.

Changes which have been proposed and are under study by the F.C.C. are:

(1) Elimination of crossarms as retirement units.

We have requested rule making by F.C.C. to eliminate crossarms as retirement units and have had some correspondence with the Commission on the matter. If the cost of crossarms were included in the cost of poles, substantial savings in both accounting and engineering forces could be achieved. Since crossarms are a dying class of plant, our present meticulous record keeping hardly seems justifiable when their retirement can be accomplished with reasonable accuracy through other means. Power companies have treated crossarms as minor items for some time.

(2) Elimination of cable terminals as retirement units.

We have also petitioned F.C.C. for rule making to eliminate terminals as retirement units. The introduction of relatively low cost ready access terminals will increasingly tend to reduce the proportion of investment in cable plant represented by cable terminals and at the same time has complicated the classification of terminals by size. Elimination of cable terminals as retirement units would permit substantial savings in record keeping.

Among other problems currently being studied by the task force is the problem of setting up in the accounting department detailed continuing property records for central office equipment. This study has not reached the stage where conclusions may be made as to the economic feasibility of the idea.

Over the years we have been making refinements in our depreciation accounting in cooperation with our depreciation engineers. We are currently studying a refinement that is called Equal Life Group depreciation or E.L.G. This plan has been given considerable study in the Bell System as far back as 1933 and has been written about by various authors, including economists and regulatory people.

Before describing E.L.G. it might be helpful to consider the objective of depreciation. As described in the Uniform System of Accounts this objective is to distribute the loss in service value of the property, that is, the original cost, less salvage and plus cost of removal, over the service life of the property under the straight line method. We believe we have met this objective very well by using the Vintage Group method or V.G. However, we think we can do better.

Under the V.G. method, studies are made of the expected service life of each class of depreciable plant placed in a year (hence the term Vintage Group). From these studies an average depreciation rate is determined for each composite class of depreciable plant. If our estimates of service lives, salvage and cost of removal are accurate, the application of that depreciation rate to our investment in that class of plant will spread its cost over its service life.

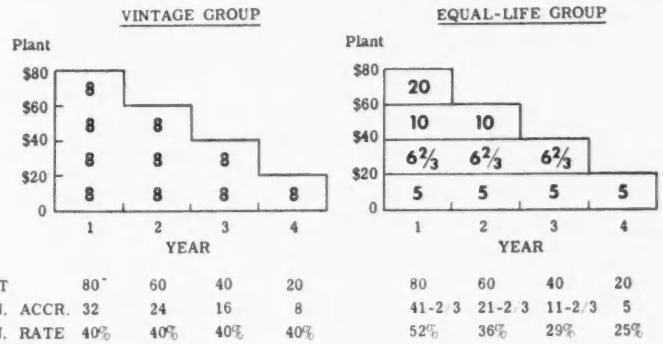
However, closer study of V.G. brings out some interesting aspects. Basically it is concerned with the average life of plant placed in a given year. In its application, the cost of any plant which is retired before reaching the average age will not be spread over the life of that plant but a part of such cost must be spread over the life of the plant that survives beyond the average age. A simple way of saying this is that under ordinary straight line depreciation the longer lived plant carries a burden for the shorter lived plant. This condition can readily be seen from the left column of *Table One.*

In contrast to V.G., under the Equal Life Group plan the cost of shorter lived units is charged to expense while they are in service, leaving the longer lived units to bear only their own burden. This can be accomplished by subdividing each vintage group into smaller groups, each of which is limited to quantities which are expected to have the *same* life. This distribution is accomplished by the use of statistical methods and makes use of the recorded experience with respect to the life and death behavior of telephone plant.

This means that, aside from salvage and cost of removal, the depreciation rate for a particular vintage, when it is new, would be the composite of 100

STRAIGHT LINE GROUP PLAN DEPRECIATION

80 UNITS COSTING $1 EACH, INSTALLED AT BEGINNING OF CALENDAR YEAR 1
WITH TWENTY UNITS RETIRED AT END OF EACH SUCCESSIVE YEAR



PLANT	80	60	40	20
DEP'N. ACCR.	32	24	16	8
DEP'N. RATE	40%	40%	40%	40%

- DEPRECIATION ACCRUED ON BASIS OF AVERAGE RATE: ORIGINAL COST / DOLLAR YEARS = 80/200 = 40%
- ONLY $8 ACCRUED DURING LIFE OF THE TWENTY UNITS RETIRED AT END OF FIRST YEAR.
- UNDER-ACCRUALS OF $12 ON 1ST TWENTY UNITS AND $4 ON 2ND TWENTY UNITS OFFSET BY OVER-ACCRUALS OF $4 AND $12 ON 3RD TWENTY AND 4TH TWENTY.
- DEPRECIATION RATE IS CONSTANT.

	80	60	40	20
	41-2/3	21-2/3	11-2/3	5
	52%	36%	29%	25%

- DEPRECIATION ACCRUED SO AS TO RECOVER ORIGINAL COST OF EACH GROUP OF TWENTY UNITS DURING ITS LIFE.
- ENTIRE $20 COST OF GROUP RETIRED AT END OF FIRST YEAR IS ACCRUED DURING ITS LIFE.
- ENTIRE $20 COST OF EACH GROUP IS ACCRUED DURING ITS LIFE.
- DEPRECIATION RATE DECLINES.

TABLE ONE.

per cent for the statistical group with one-year life, 50 per cent for a two-year group, 33 1/3 per cent for a three-year group, 2.5 per cent for a 40-year group, etc. A vintage which is a year old would no longer contain any one-year plant, and since the 100 per cent rate group is gone, the highest component rate would be 50 per cent.

A vintage which is 10 years old would have 10 per cent as its highest component rate, and a vintage 40 years old would have 2.5 per cent as the highest. Thus, the composite depreciation rate for a vintage starts out at some maximum level and declines each year. The E.L.G. principle is illustrated in the right column of *Table One.*

In practice, the Equal Life Group rates are composited into one rate for all the vintages and categories in a subaccount, so that, on the books, only one rate is used. In theory, the rates should be determined every year, but that is not necessary because plant is constantly being added and retired, with the result that the rate for any account changes very slowly.

In order for this technique to be feasible, a company needs many years of good mortality data or other bases for judging the life characteristics of its plant, that is, how the retirements of various kinds of plant tend to be distributed by age. Since this kind of information has now become available to the Bell System from engineering and statistical data, accumulated over many years, the plan could be made effective at any time.

The E.L.G. refinement in depreciation study technique is not entirely new but compares with other refinements in techniques, such as the vintage approach, which have been introduced over the years. It is different in that it defines the "group" as being made up of those units which are estimated to have the same life, rather than those units of plant which have been placed in a calendar year.

We believe that E.L.G. falls within the framework of the present wording of the System of Accounts and comes closer than the Vintage Group plan in meeting the definition of the straight-line method of depreciation accounting prescribed by the F.C.C., which requires that the service value of property be charged to operating expenses and to clearing accounts through equal annual charges as nearly as may be during its service life.

A close review of the present straight-line depreciation methods discloses that the underlying principles of E.L.G. are already expressed in the Uniform System of Accounts with respect to buildings and central office equipment. Section 31.02-80 states that the percentage rates shall not include any allowance for loss in service value of property expected to be installed in the future.

Prior to 1934, the time when this provision was promulgated, the Bell System worked up estimated service lives for individual buildings and central offices, and, in effect, developed a component depreciation rate for each building and for each central office. The service life of such a structure was itself an average. Since additions are made from time to time during the life span of such structures (some of them very large additions), and since piecemeal retirements frequently occur, the lives of the various elements of a building, for example, will vary widely, and some of them will be much shorter than the building's life span.

The shortest lives will naturally be realized by the additions made shortly before the building's retirement, since the retirement of a building, of course, results in the retirement of all the elements then incorporated in it. This meant that the use of an average or constant depreciation rate for a building or central office throughout its life required that part of the ultimate retirement losses of short-lived additions made late in life had to be made up in over-accruals for depreciation on the long-lived items before the placing of the short-lived ones.

The prohibition against inclusion of any allowance for the loss in service value of property expected to be installed in the future did not affect depreciation on the mass property accounts but it did mean that the use of an average rate for buildings and central offices had to be given up. With this change, the rate for each

structure increases throughout its life as additions are made. This explains, for example, why the depreciation rates for manual central office equipment in the Bell System rose from an average of 5.7 per cent in 1944 to 8.9 per cent in 1949. *See Table Two.*

This change in technique for buildings and central office equipment was a large step in the direction of confining the accrual of depreciation to the time when particular units of property are in service. However, it did not do anything about preventing accruals for loss in service value of short-lived items being made after such items have been retired from service. It is this additional step which would be accomplished by the introduction of E.L.G.

In our opinion E.L.G. should be an optional refinement in technique under the present System of Accounts and be equally acceptable with present methods. Hence any company which may not have as complete mortality data as it would desire before adopting E.L.G., or for other reasons would prefer to continue to use present methods, could so so without prejudice.

We have reviewed E.L.G. with the F.C.C. staff and with the N.A.R.U.C. committees on Accounts and Statistics and on Depreciation. These groups are studying the idea.

These are a few of the accounting changes which have been accomplished in our field in recent years and others which are under active consideration. They all have one thing in common — a better and more economical accounting job.

STRAIGHT LINE GROUP PLAN DEPRECIATION

Initial Building Costing $100 with 50 Year Life; Addition of $50 at 25th Year

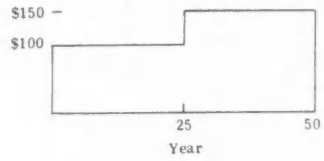
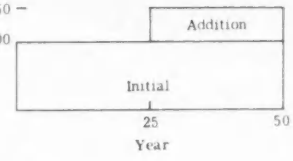
OVERALL GROUP	LIFE-SPAN (VINTAGE) GROUP
	
• Dollar yrs. for initial = 100 x 50 = 5000 Dollar yrs. for addition = 50 x 25 = 1250 Total dollar years = 6250 Original Cost = 150 Average Depreciation Rate 2.4%	• Depr. Rate for Initial 2% Depr. Rate for Addition 4% Average Rate 1st 25 years 2% Average Rate 2nd 25 years 2.7% * * $\frac{(2\% \times 100) + (4\% \times 50)}{150} = 2.7\%$
• Accrs. 1st 25 yrs. = 100 x 2.4% x 25 = 60 Accrs. 2nd 25 yrs. = 150 x 2.4% x 25 = 90 Total Accruals 150	• Accruals 1st 25 yrs. = 100 x 2% x 25 = 50 Accruals 2nd 25 yrs. = 150 x 2.7% x 25 = 100 Total Accruals 150
• Depreciation accrued on basis of average depreciation rate.	• Depreciation accrued so as to recover original cost of each part of structure during its life.
• Over-accrual of $10 during first 25 years offset by under-accrual of $10 during last 25 years.	• Entire cost of each part of structure is accrued during the life of the part.
• Depreciation rate is constant.	• Depreciation rate increases.

TABLE TWO.

7 REASONS WHY RYCOM WAVE ANALYZERS ARE BETTER . . .

1. Accuracy to ±½db
2. Low Intermodulation
3. Low Spurious Response
4. Internal Calibration
5. Sets up Quickly
6. Easy to Use
7. High Degree of Selectivity due to Crystal Filters

Offers fast accurate amplitude measurements throughout the frequency spectrum of 300 cycles to 400 kc

This instrument utilizes the heterodyne principle with balanced modulation and highly selective crystal filters which achieve the high resolution needed for accurate amplitude measurements of Carrier and Microwave Sub Carrier channels.

Direct reading in DBM for 135 and 600 ohm circuits or bridging.

Write for Literature

RYCOM INSTRUMENTS
A DIVISION OF
RAILWAY COMMUNICATIONS, INC.
9351 East 59th St., Raytown, Missouri

SPECIFICATIONS
Model 2174-A

Frequency Range: **300 cycles to 400 Kc.** Level:—72 dbm to + 32 dbm (full scale) at 600 OHMS Accuracy: ± .5db from —80 to +32 dbm; 1 to 400 Kc. Selectivity: 6db down **80 cycles** off: 60 db down **480 cycles** off. Wider crystal filter and demodulator for monitoring SSB, AM, and FM—**internal speaker** and headset jack. Spurious Response: Below 60db, low intermodulation: Below 60 db. Power Requirements: 115V, 50/60 cycles—48 Watts. **Weight 28 lbs.**

By HAROLD C. EBAUGH

Industry Cohesion and Cooperation

There are many fields of cooperation which telephone industry members experience and take for granted in their day-to-day operations of this complex industry.

I SHOULD be much less than frank if I did not tell you that I know there are men in this audience eminently better qualified to speak on this subject than I — men who could bring greater wisdom to you and share with you rich experiences they have encountered through many more years of telephone cooperation than I have. I would like to share with you this afternoon some of my thoughts on the assigned subject which will perhaps give you some ideas to take home with you and keep before you in your dealings in this interesting and complex industry in which we work. There are many, many fields of cooperation which we experience and take for granted in our day-to-day operations. There are others which I feel could stand discussion.

I will, but briefly, touch on those of which there is presently full cooperation, and will go into some other phases where perhaps some thought could be given to improvements. I am sure that during this convention we will hear technical papers given on direct distance dialing. It is a subject which certainly calls for joint cooperation of the entire industry, not only from small Independents, such as ours, but from the larger Independents and the Bell System.

Mr. Ebaugh, general manager, Triangle Telephone Cooperative, Havre, Mont., presented this paper at USITA's 1960 Conference of REA Borrowers.

It has been pointed out many times in trade magazines and other publications that improved transmission quality will be required to meet the criteria of direct distance dialing. Yet there is a lack of industry cooperation, I believe, in bringing forth all the requirements for this undertaking. Perhaps the biggest stumbling block in this vast network will be with the Independents and the Bell System providing proper maintenance of existing toll lines to meet the stringent requirements for direct distance dialing. A great area of cooperation is opening up, the exchange of technical papers, ideas, and personnel for proper maintenance and operation of this complex system. As times goes on I believe that all companies will experience a shortage of trained personnel to meet this challenge.

Data Transmission

ANOTHER phase of industry cooperation, even though it may not be of great significance to us in the West at the moment, seems to be the challenge of data transmission for the larger industries. This challenge is being met by one of our common carriers — Western Union. In the August 27 issue of *Business Week* Western Union's operations were discussed in great detail, and I am frank to say and perhaps I am not alone in being unaware of the fact that Western Union has made a phenomenal growth in the last 10 years by expanding its facilities to meet the competition and requirements of the communication industry. I believe that the cooperation, which we as Independents can offer this growing company, will be beneficial to all of us and we most certainly should look to this company for new ideas and ways so we common carriers can participate and benefit by new methods resulting from Western Union's investigations.

It is interesting to read in the article of the great expansion in the private wire services offered by this company and to read that over 2,000 companies in the United States, some of the largest, such as U. S. Steel, General Electric, United Airlines and others, have leased communication networks from Western Union and that over 213 banks in 55 cities have been connected with pushbutton switching.

Yet, the article says that they got into the private wire system business without much selling effort, for the customers were just waiting for someone to come and sell them this system. Perhaps there has been a lack of cooperation in the industry and perhaps some of us are losing some of our treasured business because we did not have the foresight or pioneering spirit or perhaps the capital to go into such a large scale program. This, in itself, is indeed a challenge and yet cooperation can be obtained, I believe, in this field.

The data phone will undoubtedly be as common in the future as our regular telephone communication system is today. When a customer is able to pay for only that time which is utilized by sending of data and reports it is not hard to visualize that nearly all

Next page, please

reports and inventories will be sent by data transmission. Are we in the Independent field ready to cooperate in this program?

Military Communications

IN THIS age we live in, of sonic booms and space communications, many of the Independents are called upon to cooperate with our military personnel in providing communications. Yet perhaps this is one of the fields where less cooperation is experienced than we realize. I wonder how many of you have had dealings with the military or other Government agencies for communications only to find that the larger companies were the only ones recognized in the telephone industry. I firmly believe that we in the Independent field must let the government agencies know we are ready, willing and able to serve all needs of their departments from space electronics to wire communications.

In the September 1, 1960 issue of *Telephone Engineer & Management* I read the report on *Project Echo* which I am sure you are all familiar with, and perhaps you have watched this satellite as it whizzed around the world every two hours charting new paths in the communication industry. The article pointed out that it is not improbable that some 50 active satellites spaced in random polar orbit at an altitude of 3,000 miles could provide communication facilities between the United States and all areas of the world.

Stop and realize how this major step forward in space communication would affect all Independents large or small because only six per cent of the world's population live in the United States and yet we have over 55 per cent of all the telephones in the world. When these space reflectors or transmitter receiving devices are completed, perhaps within the next 10 years, we will have open to us the other 94 per cent of the world's population and this certainly should stimulate the addition of many new telephones throughout the rest of the world. This project certainly takes great imagination and unlimited supply of capital to make it a

HAROLD C. EBAUGH, general manager, Triangle Telephone Co-op., Havre, Mont., presented this paper at USITA's REA Borrowers' Conference.

reality and yet it will come just as dial telephone and direct distance dialing have become a part of our everyday life.

Let's talk politics a minute. This being an election year, we certainly should bring forth all the cooperation we can in seeing that our industry is well protected by the election of candidates to high offices who recognize the value of adequate communication systems and will lend their support and dignity to the men who will work for us in the furtherance of this vital and necessary free enterprise system.

The Minuteman Program

I BELIEVE that many of us who have dealt with the military are quite concerned with the recent Air Force announcement of its decision in the Minuteman program in declaring the communication circuits on the interstate cabling to be an integral part of the weapons program and have excluded the common carriers from competing on these installations on a leased basis. I believe this one factor is one of the biggest blows to the industry in these United States and goes to show how far the United States Government will go in Government ownership where communication facilities could be obtained from the industry on a leased basis.

I urge you to investigate all these Government projects and I am sure, beyond a shadow of a doubt, that we in the communication industry can furnish, install and operate all the requirements which are for national security at a lower initial cost and by far a more economical operation and maintenance contract. If in any field of the communication industry there is a lack of cooperation at this time I believe it certainly appears today in the Government's attitude of Government ownership where leased communications can be provided.

With cooperation, I know that many of you are participating in the long line communications, the installation of Heavy Radar sites, Texas towers, military base installations and others which in my humble opinion are all part of our national security and are done so on a leased basis. We must urge and insist on full cooperation with the military and Government agencies to maintain this business for the industry. I believe it would be most helpful if we could spend some time between now and election day in visiting with our legislative people in our home communities and with the candidates to be elected to public service commissions, local city councils and county commissioners for they certainly will play a large part in setting the policies and regulations and rates which we must live with within our franchised areas.

I believe it is a good idea to ask for their cooperation and to insist that they become well informed on these subjects, for any legislation detrimental to the communication industry should certainly be explained in great detail to these candidates, not only on the local level but on the national level. Our Association has been working very hard on the 750-station exemption which is an example of how much work must be done with the legislative people to maintain the things which we feel are necessary for our existence.

Your Trade Association

LET ME urge you to become an active member of all trade associations that you feel you can afford to belong to. Your USITA has proven

Please turn to page 65

To get action... call REX

Plastic Insulated Telephone Wire and Cable

... fully described and illustrated

in this brochure. Write for your copy.

INDEPENDENT

TO FIND OUT ABOUT REX SERVICE, JUST CALL WILLIAM BRAND-REX DIVISION
AMERICAN ENKA CORPORATION, 31 SUDBURY ROAD, CONCORD, MASSACHUSETTS
EMERSON 9-9630

Long-Range Functions Of Traffic

By WILLIAM A. KERN*

MY EARLIER training in the telephone industry was in the Traffic Department. I consider this fact to be the asset side of the personal development ledger — and it also makes me feel at home in talking with you folks today.

When I looked back at our traffic operations of a few years ago, I began to realize that today a great many things have changed. I began to wonder about the future of the Traffic Department — and what we should plan for that future, hence my subject "Long Range Functions" — and I'll be content to look only as far as 1970.

It seemed to me, in planning for the future, we should decide what functions belong in Traffic and then look at some of the changes which have taken place.

When I began to think of "functions" I considered such things as force adjustment, training, practices, and engineering, which led me to a question, "What is really the Traffic Department's responsibility?" In searching for a definition, I ran across the one given by Gray Beck at this conference last year — which I'll quote: —

"This responsibility can be simply stated as the acceptance of every offered call with the intention of completing it as quickly as can be done economically regardless of the destination of the call, that is, whether it goes across the street or to the other side of the world — and also, regardless of whether it is handled manually by an operator, or whether it is dialed directly by the customer."

Do you agree with me that force adjustment ties in with "as quickly as can be done *economically*," that practices tie in with "regardless of the destination," that engineering has something to do with "whether it is handled manually or dialed directly," and that certainly training ties into the entire problem? Yes, I think we can accept Mr. Beck's definition of Traffic responsibility.

A few years ago most local calls were manually handled, and here was the practice:

Operator: "Number please."
Subscriber: "1562."
Operator: "15 62?"
Subscriber: "That's right."
Operator: "Thank you."

Then we made some progress and the operator repeated only when she wasn't sure of the number, and we had:

Operator: "Number please."
Subscriber: "1562."
Operator: "Thank you."

There were very few seconds involved — maybe three seconds on each call — but it made it possible to handle about 40 percent more traffic on the same positions and with the same operators. This was not enough. We were forced into dial operation because of economic factors — and also some biological ones. The parents just were not producing baby girls fast enough to supply us with operators.

Dial operations expanded with various types of equipment — step by step, rotaries, panel, crossbar, and now electronic switching. Please bear in mind the speed with which these changes have taken place. I shall not point out either your age or mine by mentioning a specific time. Pick your own point of reference and think of the speed of change since then.

Toll Practices

NOW TAKE a look at the toll picture. I'm sure there are some people present who can remember when toll tickets were written at "recording" positions, the subscriber dismissed, the ticket passed to the "line" positions where the calling party was called back to talk on the call.

Parenthetically, I should say this was about as positive a station identification as you could get. There came the advance to CLR, a common expression today, which means "Combined Line and Recording." The same operator who recorded the call held the subscriber on the line while attempting completion.

As in the local illustration this saved time. Following this came what is known as "overlap recording" which means the operator asks for the calling number after passing to the terminating operator — another time saver. Then we eliminated the inward operator wherever possible by toll line dialing. And now we have subscribers dialing their own toll calls just as a few years ago we put local calling on a "self service" basis.

Again, after all of these time-saving practices, there have not been enough girl babies to keep up with the need for telephone operators.

In recent years we have had another development which is neither local, nor toll, but which has had a profound effect on both, namely, Extended Area Service. This development has also reduced our need for operators.

Long-Range Functions

BY THIS time I think I have given enough history — and mentioned telephone operators to the point where we can begin to examine the future.

As we look at Long-Range Functions of the Traffic Department, I think we should constantly keep people in mind, for with each function we must consider not

Please turn to page 47

Mr. Kern, president of the Rochester (N. Y.) Telephone Corp., presented this paper at USITA's 1960 Traffic Conference.

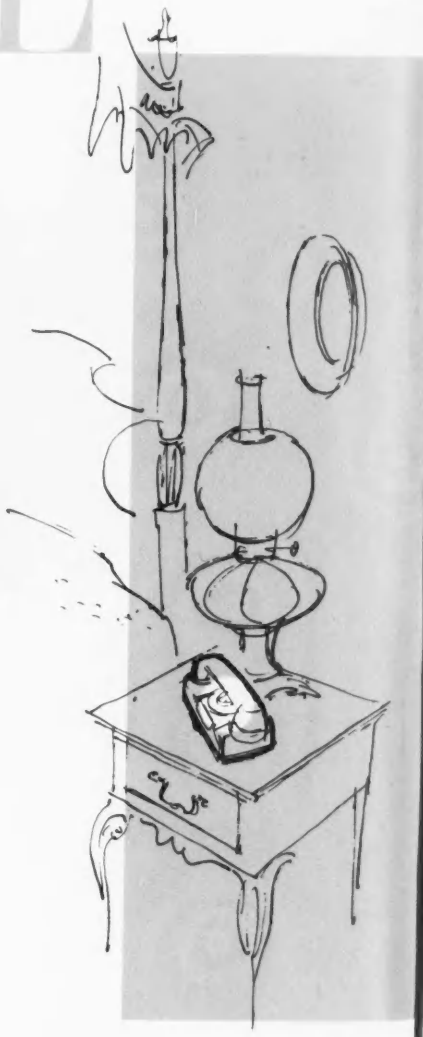
this is the new

STARLITE* telephone

BY AUTOMATIC ELECTRIC

*STARLITE is a trademark of Automatic Electric Company

STARLITE

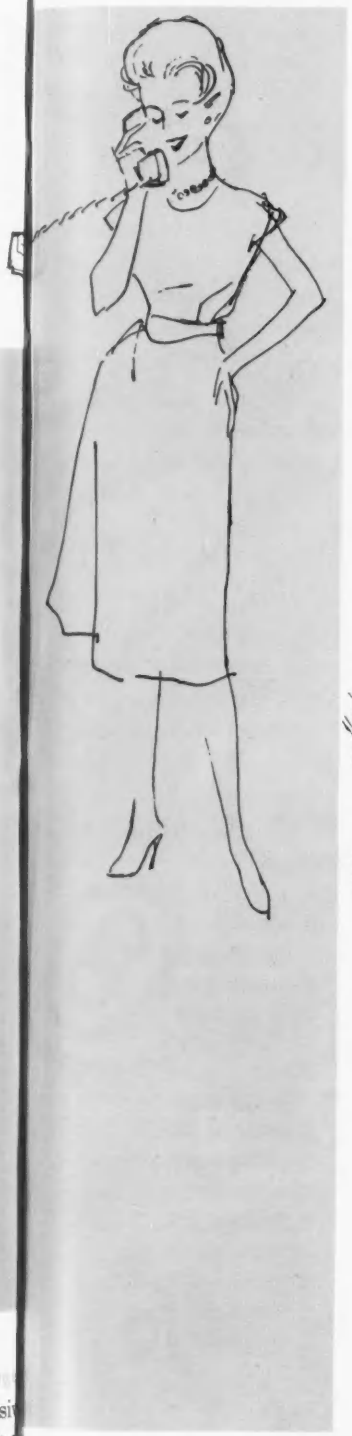


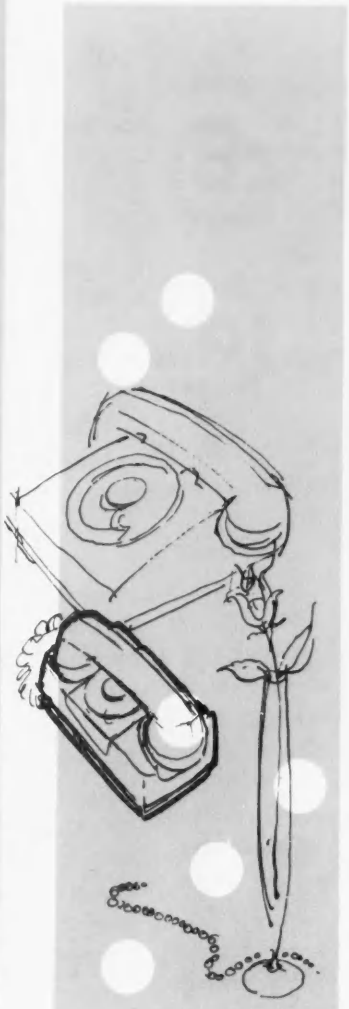
STARLITE'S dial light shines years long

That's because of its electroluminescent light...an exclusi
feature of the Starlite. There's no filament to burn out as in
incandescent lamp, so it doesn't have to be replaced eve
few months. No heat is given off, either. And it costs only
penny or two per year to operate. What's more, the d
light can be turned from soft to bright whether t
handset is *on* or *off* the ho

STARLITE holds its place.

Only the Starlite telephone has a rubberized cork pad covering the entire base. This material produces a great amount of friction—resists movement when the suscriber dials. A new handset cords helps, too. It has a soft pull and extends full length with hardly any tension.





STARLITE is an original design.

It's rectangular in shape and less than half the size of a regular phone. The handset blends with the housing to form a low silhouette and unified design. A recessed area below the dial plate provides a handy pick-up grip. Six sparkling colors to please your subscribers: white, ivory, beige, pink, blue and turquoise.

STARLITE uses a standard 3-conductor line cord.

Current for the dial light comes directly from a 110V AC outlet through a *separate* cord into the Starlight. A resistor arrangement within the phone automatically limits the current, meeting UL requirements. You'll find the Starlite easy and convenient to install. It can also be equipped with a standard plug for portability.

STARLITE can be a main station, too.

With our new miniature ringer box, Starlite can be a main station—or a ringing extension. The new wall-mounted ringer box measures only 5¼″ long, 5¼″ wide and 2$\frac{1}{16}$″ deep. It houses a high-impedance ringer, either straight-line, harmonic or decimonic—in any standard frequency. Available in Starlite's six colors for a perfect match.

To order Starlite

1. SELECT THE PHONE	ORDER NO.
Type 182 (Starlite), color, with coiled cord	NB-825
2. ADD YOUR DIAL*	
Dial with 1-0 number plate	A
Dial with ABC number plate	C
3. ADD YOUR COLOR	
Sand Beige	B
Classic Ivory	E
Turquoise	G
Forget-Me-Not Blue	K
Gardenia White	L
Camellia Pink	M

Example: If you wish a Type 182 in Sand Beige with ABC number plate, your complete order number would be: NB-825-CB

Size: 8½"x 4¼"x 4¼"

Standard package of 6: Shpg. Wt. 24 lbs.

Standard package of 12: Shpg. Wt. 48 lbs.

**Also offered with SATT dial*

To order compact ringer box (L-1508-XXX)

CHOOSE COLOR OF RINGER BOX	ORDER NO.
Sand Beige	B
Classic Ivory	E
Turquoise	G
Forget-Me-Not Blue	K
Gardenia White	L
Camellia Pink	M

Example: If you wish a Compact Ringer Box in Sand Beige, your order number would be: L-1508-XXXB.

RINGER MUST BE ORDERED SEPARATELY

Straight-line, less adjustment wheel	D-56548-ASLR
16.6-cycle harmonic	D-56548-A16R
20-cycle harmonic or decimonic	D-56548-A20R
25-cycle harmonic	D-56548-A25R
30-cycle harmonic or decimonic	D-56548-A30R
33.3-cycle harmonic	D-56548-A33R
40-cycle decimonic	D-56548-A40R
42-cycle harmonic	D-56548-A42R
50-cycle harmonic only	D-56548-A50R
50-cycle decimonic only	D-56548-A51R
54-cycle harmonic	D-56548-A54R
60-cycle decimonic	D-56548-A60R
66-cycle harmonic	D-56548-A66R
66.6-cycle harmonic	D-56548-A67R

AUTOMATIC ELECTRIC

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

CIRCULAR 1966 45M 10-60 McK

PRINTED IN U.S

"Functions of Traffic"

(Continued from page 42)

only the number but the quality of the people we shall require — and keep in mind that it is Traffic's responsibility to keep our products — telephone traffic — moving.

We have heard much of the advent of electronic switching — and a few miles from here an experimental office is in operation. To the best of my knowledge this is the latest idea for handling local traffic.

Remember I limited my views to the next 10 years, and I don't believe there will be very many electronic offices during that time. This means we will continue to use a lot of the kinds of dial equipment we are already using.

One of the long-range functions of the Traffic Department, then, will be to manage the present types of dial offices in such a way that our subscribers will receive good service while the equipment is used at high efficiency.

One of the things that has always bothered me about a dial office is the percentage of idle time over a 24-hour period. In order to get some idea about how much there is, I multiplied some busy hour peg counts by 24, then divided the result into the total day peg count. This told me that if the equipment was carrying a full load in the busy hour there was 58 percent idle time over the remaining 23 hours.

Now if you have been engineering your dial offices according to the "good book," the only time you will have a full load is just before you make the next addition. This means, then, that most of the time the equipment is idle *more* than 58 percent.

Well, I don't believe we should change our subscribers' calling habits, because we want them to use our service whenever they need it — but I think one of the longe-range functions of the Traffic Department is to find a way to keep the switches at just the right capacity to handle the busy hour traffic.

In a multi-office company which uses the same type of equipment in several offices this might be done by moving switches from one office to another as needed. A single office company might install the frames and banks and make a deal with the supplier to furnish the switches as needed.

You have a right to ask why I place importance on this item. My first reason is to minimize the investment. In addition I am convinced that the subscriber who regularly encounters a short wait for dial tone or a paths busy will be less critical than one who receives immediate dial tone and no paths busy for one and a half years, then for six months experiences, what to him is, a badly declining service.

This all boils down to the fact that one of the functions of the Traffic Department is to find a way to provide dial service on a one delay in a hundred basis throughout the engineering period instead of at the end of it.

Unquestionably another function of the Traffic Department will be to find ways of handling the ever increasing toll traffic without adding people. The way I keep coming back to this subject you may get the idea I'm against having people around — and that certainly is not the case. I'm simply looking at the arithmetic and recognizing the fact that right now there are companies which are having a tough job finding operators to handle the present traffic.

One of the ways of doing this is through the use of Direct Distance Dialing, to not only station traffic but the Person and Collect traffic as well. Fortunately I knew in advance a part of this program would be devoted to this item so I merely mention it to show that it is recognized as a Traffic function during the next 10 years.

You have all probably heard of the dialing code for customers to reach Information in distant Numbering Plan Areas. I refer to 555-1212 preceded by the area code. This is the first step toward some form of centralized Information — but like a baby's first step it is a very small one.

One of the Traffic functions during the next 10 years will be the solution to this problem. Most of the places where this has been established are on a very limited basis. Perhaps all of our Independent friends are sitting back waiting for the Bell System to solve the problem since the NPA's are all set up with a Bell office as the hub.

The solution to the problem may be a centralized Information Bureau some distance from the primary center where there is available labor. Who knows? Some Independent company may come up with a solution which would make it possible to sell its service to the Bell Company. At least we can agree that the solution to this problem is a Traffic function.

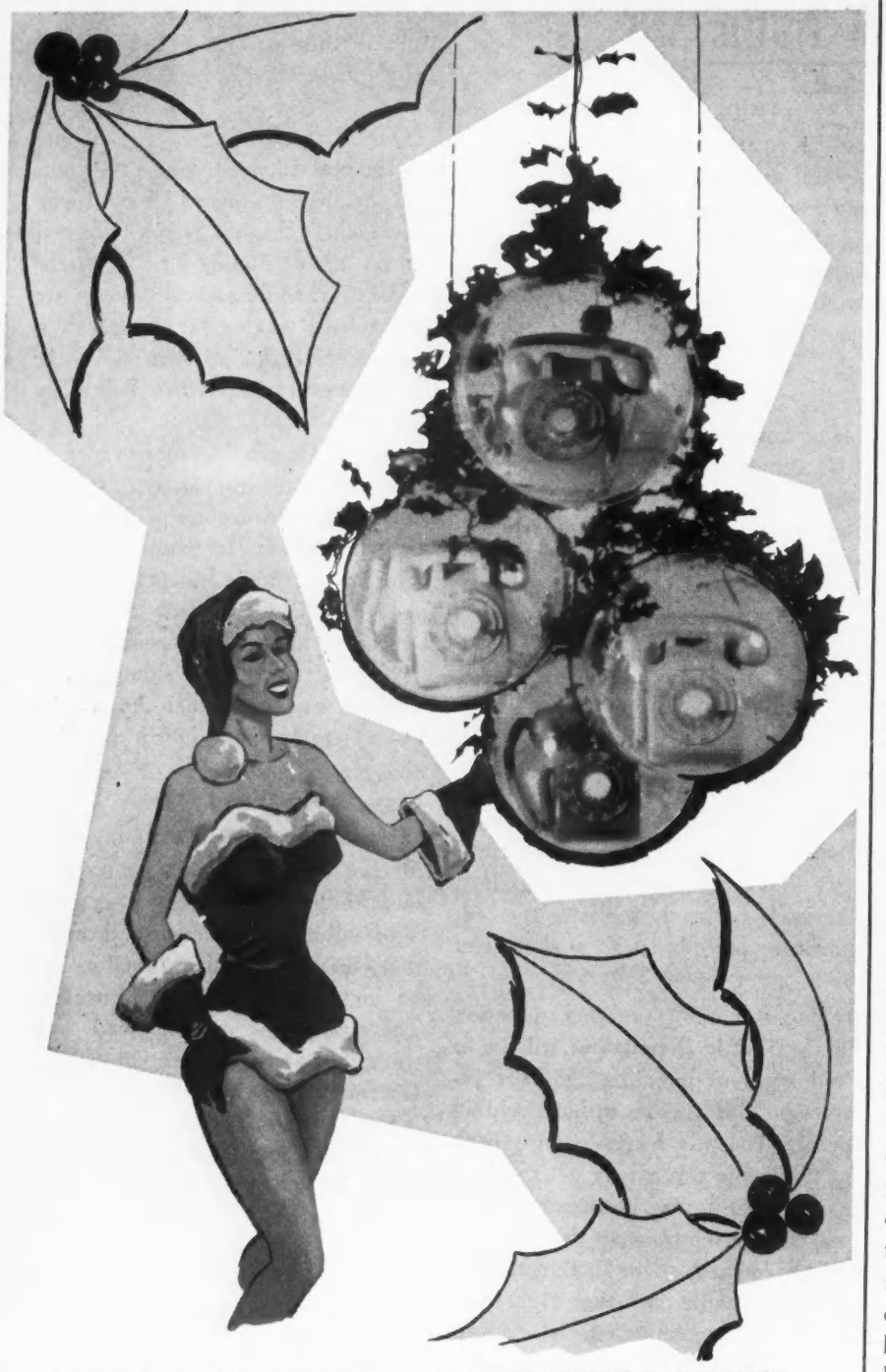
Force Adjustment

THERE is no doubt in my mind but that wages will go up some more in the next 10 years. This places a premium on efficiency. It means that one of the Traffic functions will be an ever alert force adjustment. This can be accomplished only through the closest attention of Chief Operators.

Basically force adjustment is a matter of arithmetic but this part of it is merely the foundation. The actual accomplishment of efficient operation results from the sound judgment exercised by the Chief Operator on a daily — even hourly — basis.

One of the big problems seems to be incidental absence. As I see it one of the big jobs during the next 10 years will be to sell the idea that there is more enjoyment to be had by being on the job handling telephone traffic than there is by reporting off, then going on a picnic.

History is full of stories showing the telephone operator's devotion to duty — but at the moment it seems we are in a period of indifference. We are living in a generation that has been taught to "get all you can" instead of "give all you can." Since traffic work is so different from other jobs, because every call must be



SELL MORE TELEPHONES
with GLADWIN DISPLAYS!

Christmas time, anytime . . . . Gladwin's displays bring more revenue and sell more services. Use *"The Most Wanted Line"* and get the most wanted results: BIG SALES! Write for our display brochure.

GLADWIN PLASTICS, INC.
165 COURTLAND STREET N. E.
ATLANTA 3, GEORGIA

handled when it is offered, it means that regular attendance is a lot more important in Traffic than in some other places.

I have mentioned the point that I believe wages will go up in the next 10 years — and I meant *in general* this would be the case. It seems to me that we owe it to ourselves to see that Traffic wages are competitive with those in other departments. I would think it is a Traffic function of the next 10 years to make sure this is accomplished. I believe it is self-evident that unless this is done we will wind up with an unbalanced work force where the talent is every place except Traffic — and yet we will depend on Traffic to keep our products on the move.

It is my impression that our toll traffic is more volatile than ever these days. This is probably caused by the instantaneous transmission of news. Our entire business world is based on activity at a very fast pace.

A business man driving along the highway gets the news on his car radio. He hears an item that may have some effect on his business. He either uses his mobile telephone or heads for the nearest pay station. These are not local isolated situations but far-reaching cases — all affecting traffic.

Why should a hurricane along the east coast distort the telephone traffic on the west coast? It does — because people have moved there from the east and are still interested in relatives and friends. Maybe some are on vacation and worried about their homes. There are some who have business interests in both places.

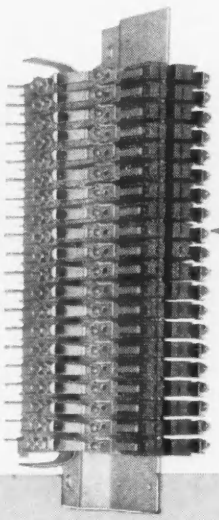
I mention these items to emphasize that during the next 10 years Traffic must develop force adjustment programs, mathematically to be sure, but also on the basis of sound judgment on the part of Central Office management. Sound judgment must be paid for.

I think there is a kindred item that goes along with force adjustment and training so I'm going to talk about it right between these two items. We earlier defined the Traffic responsibilities. How do you know whether

Please turn to page 63

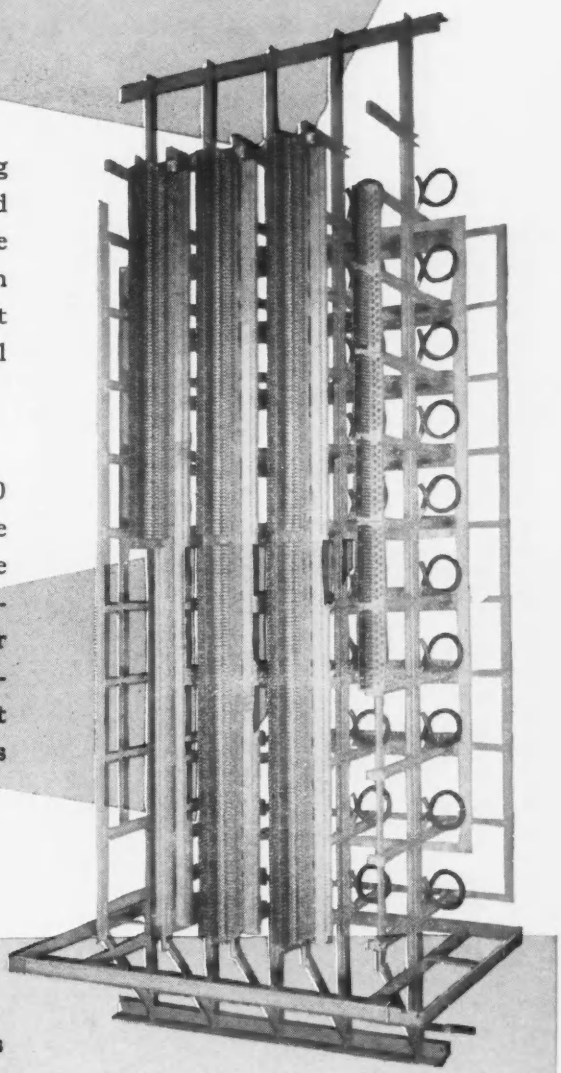
MDF+3800
Means Economy

Do you know that more and more Cook (MDF) Main Distributing Frames are being installed in central offices throughout the world today because their *design simplicity* means *economy* where time, space and cost are important? Standardized unit construction permits greater flexibility in field assembly. These frames meet every requirement for termination of outside cable in central offices and for cross-connecting of lines, and . . .



Cook Type 3800
Central Office Protector

Do you know that Cook Type 3800 Central Office Protectors give the ultimate in dependable performance when installed on Cook Main Distributing Frames? They are used for cable termination and provide protection for central office equipment and personnel from high potentials and sneak currents.

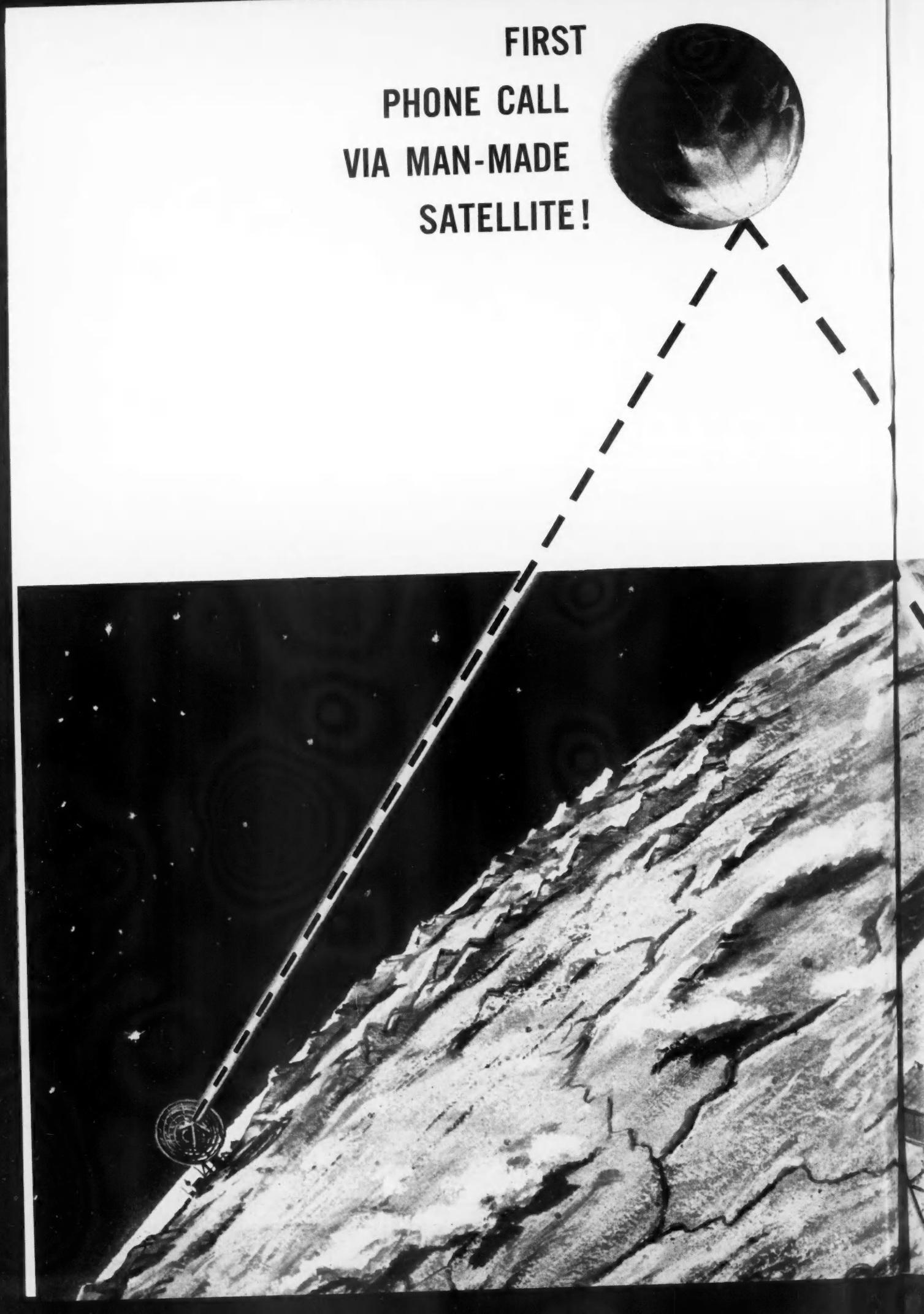


Cook Type "L"
Main Distributing Frame

Take advantage of the economies that can be yours by installing Cook Main Distributing Frames with Type 3800 Central Office Protectors in your next construction job. Consult your local distributor or write to us for specific information.

COOK ELECTRIC Company
Since 1897

2700 Southport Avenue Chicago 14, Illinois


FIRST
PHONE CALL
VIA MAN-MADE
SATELLITE!

Success of Project Echo forecasts revolutionary new developments in telephony

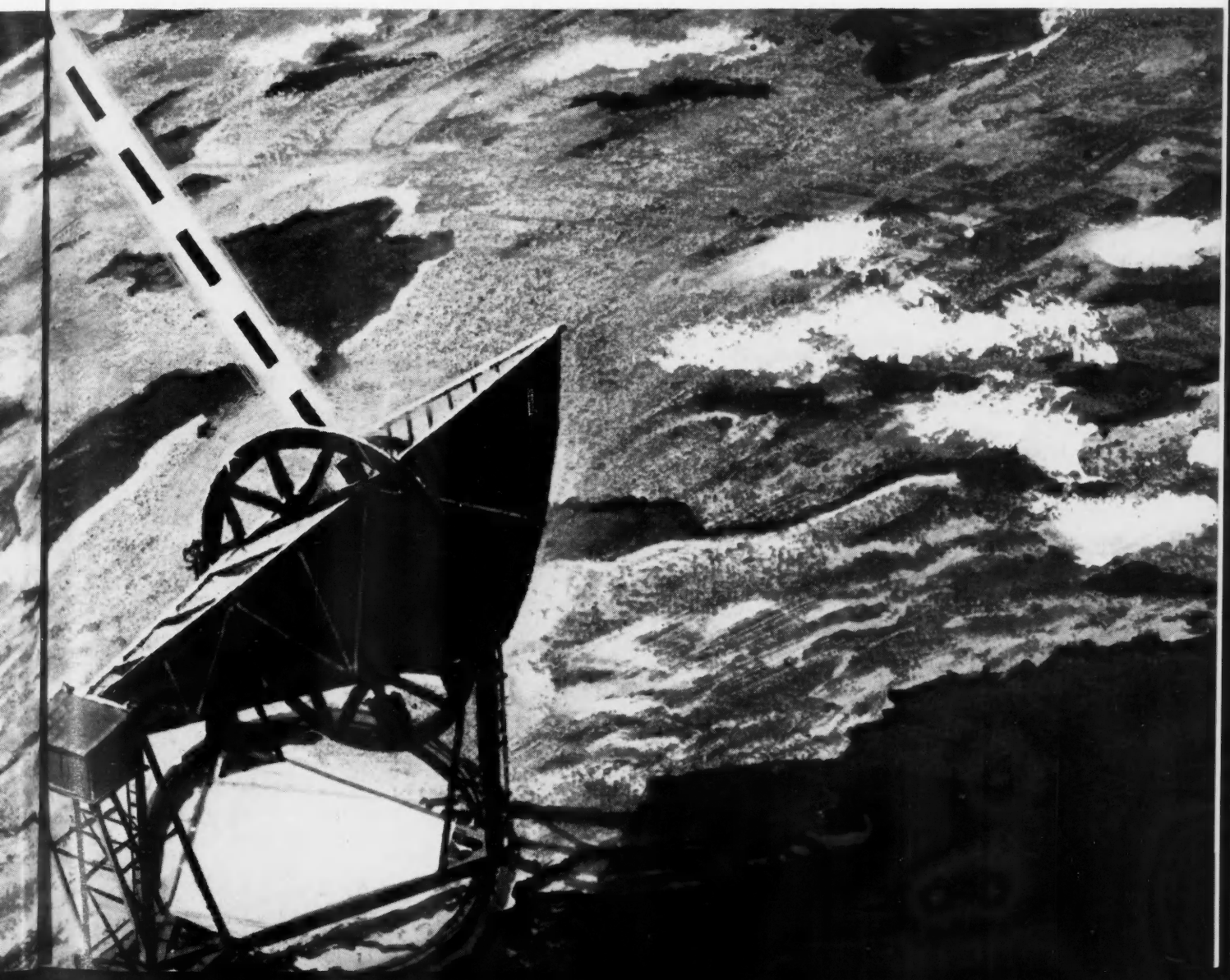
Since August 13, outer space has become a new pathway for telephone transmission.

On that date a phone call was successfully bounced across the country from a satellite—between Bell Telephone Laboratories' Holmdel, N. J., test site and the Jet Propulsion Laboratory of the National Aeronautics and Space Administration in Goldstone, California. The satellite is an aluminized plastic sphere 100 feet in diameter, and was guided into a 1000-mile-high orbit by Bell Laboratories' highly accurate Command Guidance System.

The success of this initial experiment is a big step toward the future possibility of sending telephone calls around the world by means of a system of orbiting satellites. It is hoped that eventually television signals, too, can be sent via satellites, thus opening the way to trans-oceanic TV broadcasts.

As NASA's Project Echo continues, and more is learned about this new communications method, the entire telephone industry stands to gain. The service we give our customers will become even more useful and enjoyable.

BELL TELEPHONE SYSTEM



New Products' Showcase

SUPPLIES And EQUIPMENT

By Dick Reynolds

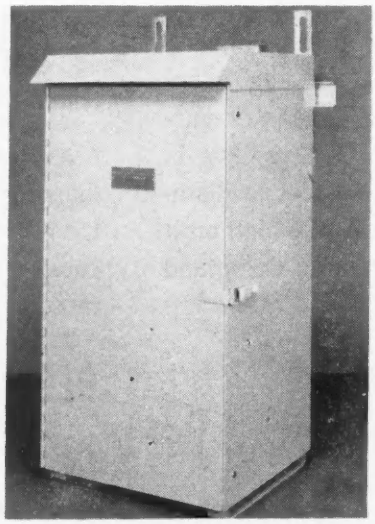
Pole Mounted Dryer

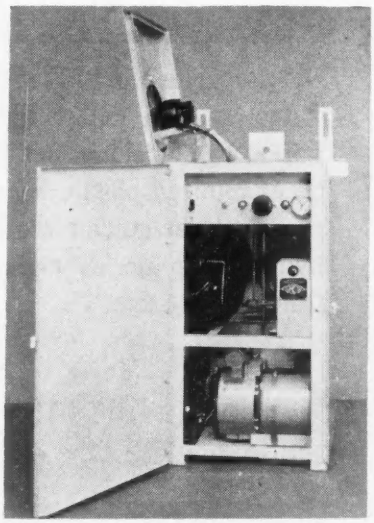
PUREGAS Equipment Corp. has announced the development of a pole mounted air dryer to supplement its line of central office cable pressurizing air dryers.

The Puregas Model 600 Pole Mounted Air Dryer is designed to deliver 600 standard cubic feet of dry air per day at adjustable pressures from 0 to 15 psig, and will opperate satisfactorily within an ambient range of —40°F to 120°F. Unit is fully automatic and is furnished as a complete unit with air compressor, motor, heat exchanger, refrigeration system, and alarm facilities, all encased in a baked enamel cabinet.

Air drying is accomplished by a combination of compression, refrigeration, and chemical absorption. In operation, ambient air is compressed several atmospheres, then cooled in a refrigerated heat exchanger to subzero temperatures. This squeeze-freeze effect condenses the moisture content out of the air stream as water and ice is removed from the system during a defrost cycle by an automatic water trap. The dry air stream leaving the heat exchanger passes through a small reserve tower of desiccant which dries the air during the defrost cycle. Application of these drying principles reduces the relative humidity of ambient air from 100% at high temperatures to less than 2% at 70°F.

On aerial plants running considerable distances from central offices this unit, pole mounted in remote locations, will boost cable pressure toward the cable ends and back towards the central office pressure source ensuring effective minimum pressure levels along the cable run.

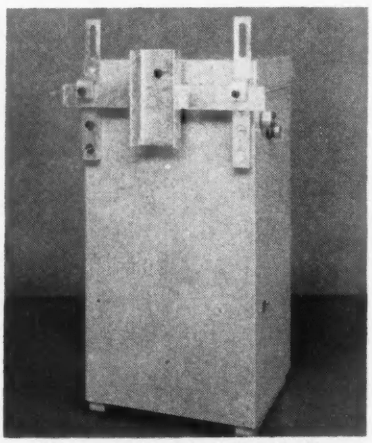




Two views of new Puregas Model 600 Pole Mounted Air Dryer.

This air dryer can be employed to pressurize strategic military cables, sage cables, airport cables, cables serving isolated communities, important commercial and professional subscribers and particularly those subscribers with guaranteed service.

It also bears consideration for pressurizing cables leaving small exchanges, community dial offices, repeater stations, etc. In such locations it can be mounted either on an inside or outside building wall or the nearest telephone pole, thereby minimizing space requirements which are always at a premium in such offices.



Rear View of Model 600 PM Showing Pole Mounting Hardware.

The new Pole Mounted Model 600 along with the Model 750, Model 1500, and Model 5000 Puregas Air Dryers now offers the telephone industry units tailored to pressurize the cable systems of entire cable plants from single cables to the largest central offices. *Check NP* 525.

Starlite* Telephone

NEW extension telephone, featuring a soft glowing dial light, has been announced by Automatic Electric Co.

The Starlite* telephone was developed to give subscribers an attractive, highly portable instrument which requires about half the space of regular desk phones. Rectangular in shape, its original design blends the handset with the housing to form a low modern silhouette.

An exclusive feature of the Starlite telephone is the electro-luminescent lighting which makes dialing in the dark easy. The soft green light will shine for years longer than an incandescent lamp, since there's no

A greatly enlarged section of one pair.

JACKETED-PAIR Distribution Wire

Will serve you longer . . .will provide the true economy that high quality always gives.

NEW

- ★ **TOUGHNESS** — Withstands unusual physical abuse.
- ★ **ELECTRICAL STABILITY** — Minimizes attenuation changes from dry to wet weather.
- ★ **EASY PAIR IDENTIFICATION** — Single, two-color jacket codes individual pairs.
- ★ **EASY ACCESS TO PAIRS** — In all pair sizes each pair appears on the outside at frequent intervals.
- ★ **EXTREMELY LOW RESISTANCE UNBALANCE**

High density polyethylene insulation . . . Extra-heavy wall thicknesses . . . Fully color-coded common jacket over each pair.

WB WHITNEY BLAKE CO.

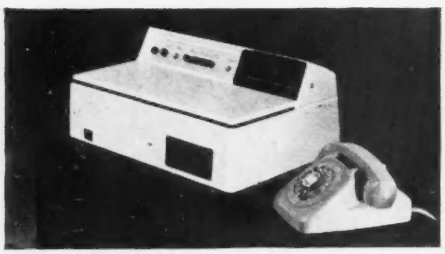
NEW HAVEN 14, CONNECTICUT

TELEPHONE CHestnut 8-5515 TWX: NH84

Automatic answering for everyone

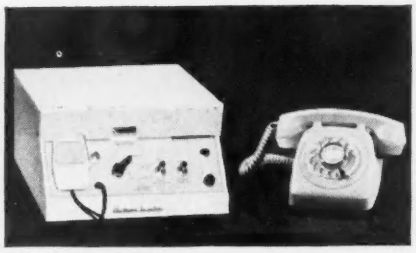
New full line of

New line of ELECTRONIC SECRETARY telephone answering sets



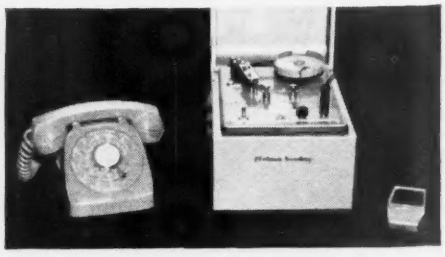
LP(Long Play) model

The de luxe model that "does everything." Answers the phone automatically with message prerecorded by customer—(easily "erased" and changed)—records incoming messages, plays them back when customer returns. Takes any number of incoming messages up to 2-hour capacity. For service companies and individuals, stores, offices, plants and specialized uses in many other types of business.



SP (Short Play) model

This performs the same answering function as the LP model but has a more limited capacity. Answers the phone, gives message to caller, records up to twelve 13-second incoming messages. Compact, about typewriter size. Specially designed for the small service outfit or business. Low monthly rental greatly broadens the market.



AO (Answer Only) model

Answers phone with prerecorded announcement, but does not record incoming calls. Has microphone and tape recorder. Used by all sorts of organizations to deliver informative announcements up to 3 minutes. Theatres tell what's playing. Fuel suppliers and others leave numbers to call for emergency service at night. Advertisers sponsor weather reports, stock closings. Churches give inspirational messages.

automatic answering sets opens big new source or extra revenue for you

Now, virtually every business customer is a prospect for the ELECTRONIC SECRETARY® telephone answering set. For now you can offer a full line of three ELECTRONIC SECRETARY devices to meet the individual needs of almost any business, large or small.

For small businesses, or larger companies

Think how many customers you serve who cannot afford extra help just to mind the phone when they have to be out of their place of business during the day. A real estate man, for instance, showing property. A contractor checking up on a job. A public accountant conferring with a client. A veterinarian making his rounds. A one-man shop that closes up for lunch. . . .

Yet every one of these customers know that a call missed can be money lost. That's why you have such a big ready-made market for the ELECTRONIC SECRETARY® automatic answering sets. At a very modest rental it makes sure every phone call is answered, every message received. It solves the customer's problem of how to be in two places at once.

24-hour a day service

These answering sets are great for bringing in business after hours, too. People who find it impossible or inconvenient to call during the day really appreciate this round-the-clock service. A laundry gets night orders for pickup the following day. A television repair shop gets a request for service the next morning. Plumbers, fuel distributors, and others get emergency calls which can be referred to another number.

Other business uses

But the smaller service outfits do not by any means represent your total market for the ELECTRONIC SECRETARY line. Wholesalers and distributors use these sets in batteries to take orders and reports from salesmen. Retail stores use them in their fast-growing "shop-by-phone" services. Theatres and many other organizations use the "Answer Only" model to deliver pre-recorded announcements to the public.

National advertising coming soon

A powerful national advertising program for ELECTRONIC SECRETARY sets is scheduled for leading magazines. This should lead to a rapidly growing demand in your area. To be sure you're ready to take advantage of it, call or write one of the distributors listed below.

Electronic Secretary Industries, Inc., Subsidiary of GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

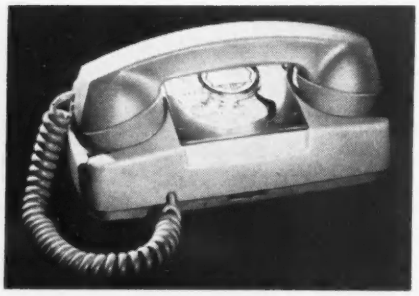
distributed by

AUTOMATIC ELECTRIC SALES CORPORATION
400 North Wolf Road Northlake, Illinois

LEICH SALES CORPORATION
427 West Randolph St., Chicago 6, Illinois

filament to burn out. Bulb replacement problems are also eliminated. A small finger wheel regulates light intensity, whether the handset is on or off the hook.

The Starlite telephone's anodized aluminum base is covered with a



rubberized cork pad that produces surface gripping friction to prevent movement when the subscriber dials. The handset utilizes a soft pull cord.

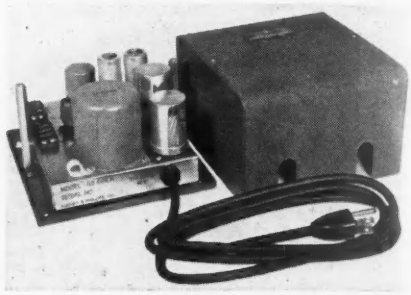
The use of standard three-conductor line cord and a separate dial light cord make installation of the telephone simple. The light cord plugs directly into a 110 V AC outlet, with current automatically limited by a tiny resistor. The Starlite telephone can also be equipped with a standard, four-prong plug for portability.

This new telephone will be manufactured in six pastel colors, including beige, pink, blue, white, ivory and turquoise. Also available in these six colors is a new miniature ringer box. With the ringer box, the Starlite telephone can be used as a main station, or as a ringing extension. The wall-mounted unit — 5-1/4″ long, 5-1/4″ wide, and 2-1/16″ deep — houses a high impedance ringer, either straight-line, harmonic or decimonic, in any standard frequency. *Check NP* 526.

Compressor Amplifier

A COMPRESSOR Amplifier for the automatic level control of telephone loudspeaker systems is now being produced by Hughey & Phillips, Inc. The principal application is in installations providing simultaneous local operation of a telephone handset and a loudspeaker.

The Type GB-444 Compressor Amplifier minimizes the wide variations in signal level which normally result between the distant end and local talkers. Also, as a result of new circuitry, the tendency to loudspeaker - handset feedback is



greatly reduced, allowing the use of higher loudspeaker levels without objectionable "singing."

The entire unit is covered by bell box type housing for wall mounting. The base plate is 7½ x 7″, with the same mounting hole locations as the 105 apparatus box. *Check NP* 527.

Water Loads

THE ADDITION of new C-Band and XB-Band Water Loads to the Sierra 187 series of high-power, liquid-cooled, waveguide terminations has been announced by Sierra Elec-

the magic word is...

HALLAPLAST

BRIGHT NEW COLORS BUILD NEW BUSINESS and "HALLAPLAST" colors, "more durable than the original finish," can transform dingy, black or colored instruments to modern-hued, user-attracting units. Hallaplast is equally efficient over black or colored styrene, bakelite or metal. The price is low and the service fast. Order Hallaplast while your phones are repaired and brought up to date at the Hallamore Telephone Service Center, Hallamore Electronics Division of The Siegler Corporation, 714 North Brookhurst Street, Anaheim, California. PRospect 4-1010/D.D.D. area 714.

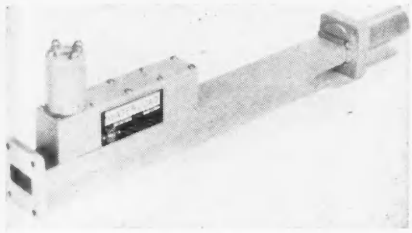
HALLAMORE

IMPROVING TRANSMISSION BY ADVANCED ELECTRONIC TECHNIQUES

tronic Corporation.

The terminations employ the Sierra 187 series to combine extremely low RF radiation and VSWR (max. VSWR of 1:10 and typical values of 1:05) with maximum reliability and power capability.

Unpressurized, Model 187B-C can be operated at average powers to 5 KW or peak powers to 500 KW.



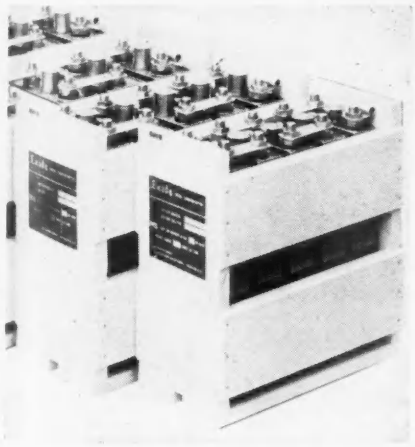
Model 187-XB is rated at 3 KW average power or 300 KW peak power. Both models can be pressurized to 45 psig to permit operation at higher power levels.

SL, S and X-Band Water Loads are also currently available for 1.7 to 2.6 kmc, 2.6 to 4.0 kmc and 8.2 to 12.4 kmc applications respectively. *Check NP* 528.

Nickel-Cadmium Batteries

EXIDE. INDUSTRIAL Division of The Electric Storage Battery Company has added nickel-cadmium batteries to its line of industrial storage batteries.

The new batteries, having nickel- and cadmium-oxide active materials contained in perforated steel pockets of the positive and negative plates,



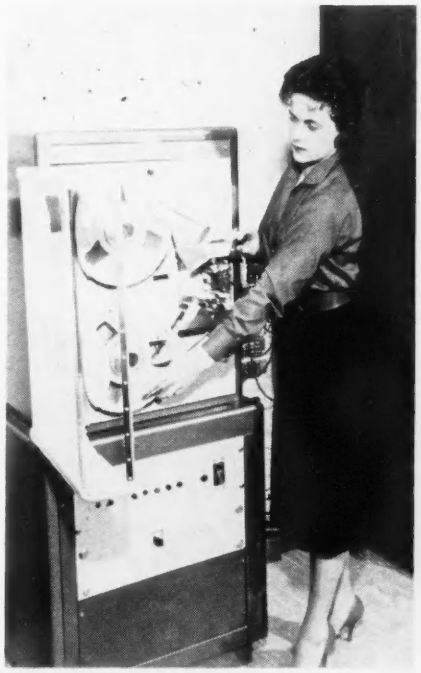
are offered by Exide for use in a number of specialized applications where this type of battery sometimes is a superior power source.

The new line is available in 22 electrical sizes, with eight-hour capacity ratings ranging from 10 to 450 ampere-hours, and in other special types and sizes. *Check NP* 529.

Data Communication System

A HIGH-SPEED data communication system has been placed in operation by the Convair Division of General Dynamics Corporation, linking the Division's facilities in Pomona and San Diego, California. The system transmits scientific data at a rate of 2400 bits per second over a regular leased telephone line more than 200 miles long.

The communication system, utilizing the Stromberg-Carlson Model S-C



301 High-Speed Data Transceiver, is highly flexible in the type of input and output devices which may be used with it. Punched card, punched tape, magnetic tape and keyboard inputs are available, and outputs may be on magnetic tape, or on the S-C 3000 High-Speed Electronic Printer. Slow inputs can be stored for rapid transmission and output, thus realizing significant savings in transmission time. The system also provides voice communication over the same leased wire.

This new system makes it possible to transmit data at high speeds, thus eliminating the need for additional telephone lines. By automatically converting the data from punched card input to a magnetic tape output the system eliminates additional conversion equipment presently required in many other types of data communication systems. *Check NP* 530.

Digital Code Sender

THE TGS-735 Mobile Digital Code Sender is an instrument suited to the task of dialing a particular base station, dispatcher, or roving mobile with the same degree of reliability as your telephone. Used in conjunction with Secode Digital Decoders, TGS-735 will signal through channels too noisy for speech.

Housed in a cylindrical shell the unit is installed in any vehicle by an all-purpose bracket. The use of transistors, coupled with temperature and voltage stabilization, gives consistent performance under all conditions encountered in mobile service.

When operated, the instrument turns on the mobile transmitter and modulates it with pure audio tone at 2805 cps. The dial interrupts the tone a number of times numerically

equal to the dialed digit. A transistor delay circuit holds tone and transmitter on between digits and for 4 seconds after the last digit, to allow for "ring" time at the selected receiver. *Check NP* 531.

80-Line Dial PBX

STROMBERG-CARLSON has developed a new Dial PBX, called the F-80A, to meet the space requirements of modern PBX service for large and medium size offices. The F-80A offers up to 80 lines, 14

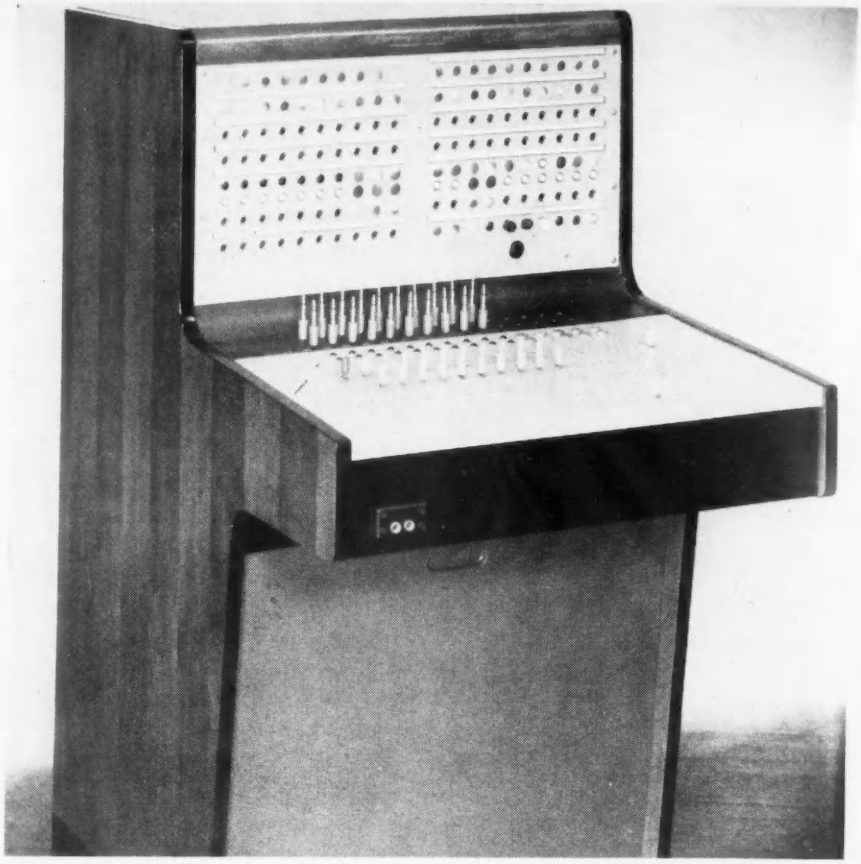
trunks and 14 connecting links in 1/3 less space than former models.

All switching equipment for the single party finder-connector system is housed in an acoustically treated cabinet which minimizes normal equipment noise. The cabinet measures 6′4″ high by 4′1″ wide by 2′ deep and is roller mounted for easy movement within an office.

Using dial principles proven in XY Dial exchanges throughout the country, the F-80A offers maximum flexibility to PBX subscribers. Either an attendant's key turret or cord switchboard, for even faster operation, may be used with the system.

The F-80A provides single party lines for quick, dependable service. Other features include restricted service, call distribution, executive right-of-way, night switching, conference service and code call.

Because the F-80A utilizes universal jack-in circuit plates, no special wiring is required for combination central office trunks, E & M dial to dial trunks, loop dial to dial trunks or ringdown trunks. This permits the F-80A to meet most applications with simple installer's wiring. Power is supplied to the equipment unit merely by plugging it into a wall socket. *Check NP* 532.



F-80A cord type switchboard, from Stromberg-Carlson provides fast service for larger offices. It offers a full range of modern communications services.

Scramble Device

THE DELCON Corporation has developed a "scrambler" security telephone device for business, industry and law enforcement.

Delcon's "scrambler" security telephone is a transistorized device developed for use with standard telephone systems and instruments. It weighs 27 ounces and can be carried in a topcoat pocket or a small briefcase and resembles a slightly oversized telephone handset.

There are no wires or other connections between the two instruments (the "scrambler" and the telephone handset itself). The user places the device against the handset and holds the two instruments together when he wishes to "scramble" a conversation.

Internal batteries furnish power for the 10-transistor circuit which transforms ordinary speech into incoherent gibberish. The gibberish is transmitted over the regular phone circuit and a second Delcon "scrambler" security telephone at the other end of the conversation will translate it back into normal speech. *NP* 533.

NEW PRODUCTS' DEPARTMENT 11-1-60
Telephone Engineer Publishing Corporation
7720 North Sheridan Road, Chicago 26, Illinois Date .....

ATTN: Dick Reynolds

Please send me additional information concerning the following New Products.

NP 524..... NP 525..... NP 526..... NP 527..... NP 528.....
NP 529..... NP 530..... NP 531..... NP 532..... NP 533.....

NAME ..... POSITION .....
COMPANY .....
ADDRESS .....
CITY ..... ZONE ..... STATE .....
I am a subscriber to TE&M. ☐ Yes ☐ No (check one)

(ADVERTISEMENT)

A Report to the Telephone Industry . . .

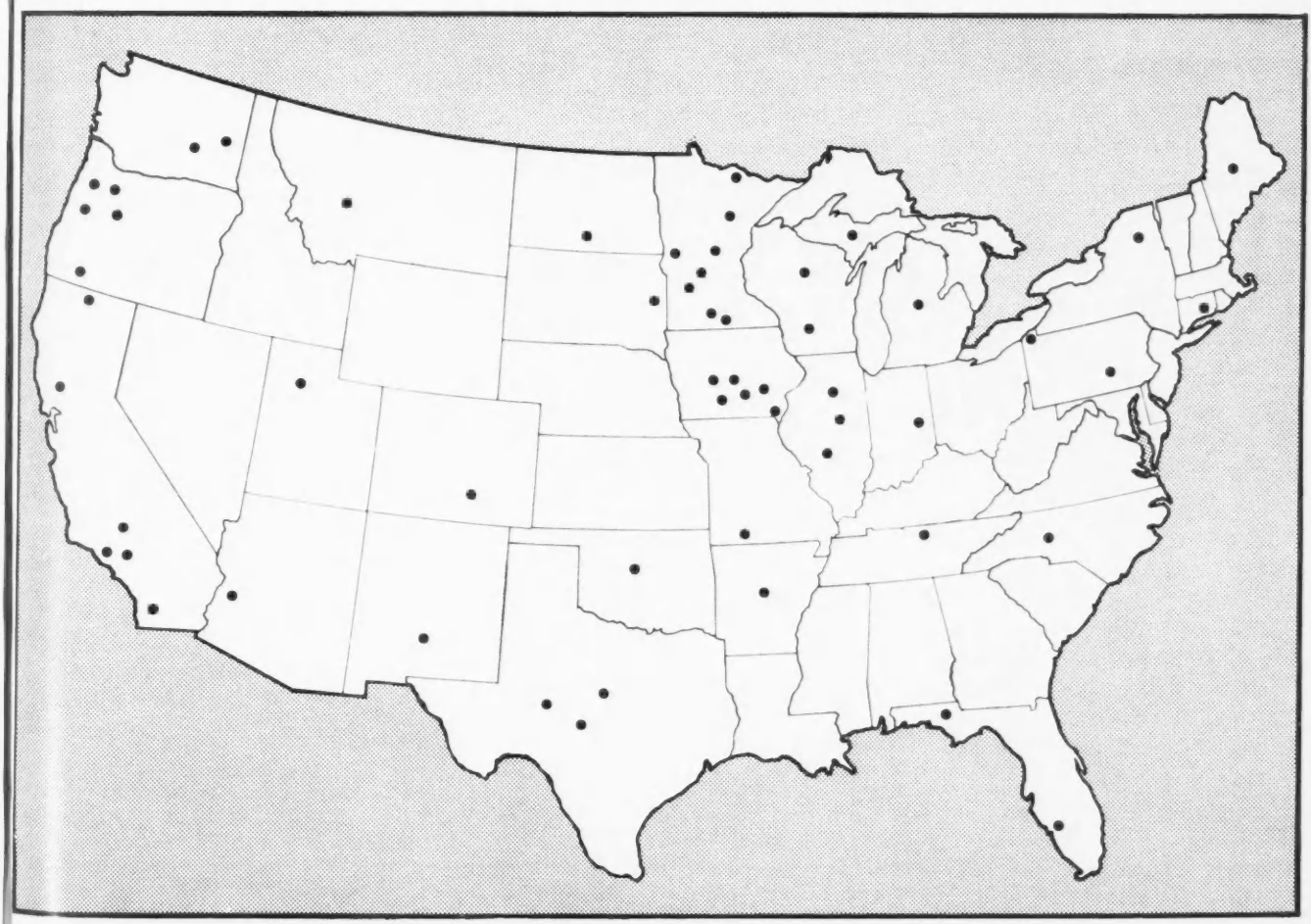
on the PREFORMED Communications Tie

Enthusiastic acceptance of the new PREFORMED Communications Tie by the telephone industry introduces a new era of open line wire construction.

TELEPHONE engineers, managers, and plant men in all parts of the country recently participated in a fact-finding survey on the new PREFORMED Communications Tie. The survey was conducted by an independent research organization.

Eighty questionnaires were mailed. The response measurement was 61.25%, or 49 completed questionnaires, which came from the locations marked on the map below. This whole-hearted cooperation emphatically reflects the high degree of interest which exists among telephone engineers in technical advancements that go to improve construction, methods, and services.

The results of the survey are presented in the following pages as a service to the telephone industry.



(ADVERTISEMENT)

Tabulation of Survey Results

The questions in the survey and the statistical results are as follows:

1. Have you installed the new one-piece PREFORMED Communications Tie?

Yes—41 No—8

2. What size and type wire and what type insulators were used on the line on which the ties were installed?

Thirty-one different combinations of wire and insulator sizes were reported. Examples of these combinations are as follows:

Wire	*Insulators*
HTL 135	No. 17
.109 CW	No. 9
.080	No. 53
HTL 85	No. 16
.102 CS	No. 3
.104 CS	No. 16
HTL 135	No. 16

3. How long were the spans on which you used the new tie?

Spans reported in the survey ranged from 160 to 500 feet. Average length of spans reported—309 feet.

4. What is your description of the completed tie?

Excellent tie	25
Good tie	14
Fairly good tie	2

5. Did you have occasion to use or benefit from the unbalanced holding feature inherent in ties based on the PREFORMED principle?

Yes—12 No—26

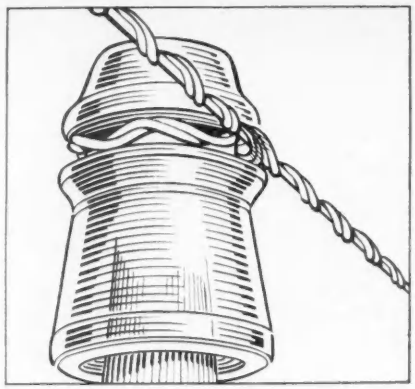
Would you like more information on this feature?

Yes—26 No—9

6. What was the average time required to apply the new Communications Tie?

Reports of time varied from 15 seconds to two minutes for a single tie—3 to 5 minutes for two ties—and 5 minutes to climb pole, make two completed ties and return to ground.

A number of companies reported the new tie was installed in one-fourth to one-half the time required for other ties.



Tie cradles line wire—prevents abrasion at insulator.

7. Did the line wire rest against the insulator after any of the ties were applied?

No—39 Yes—2

8. How easy (or difficult) was the installation of the new tie?

Very easy to apply	29
Fairly easy to apply	11
Somewhat difficult	1
Difficult to apply	0
Very difficult to apply	0

9. What is your opinion of the color coding system used on the various size ties?

Very good system	23
Fairly good system	0
No opinion	12

10. Did you use the new tie for new construction or maintenance?

New Construction	28
Maintenance	5
Both	9

11. Did you experience any difficulty applying the new tie where there was more than ten feet of pull?

No difficulty	22
Some difficulty	3
These locations were particularly difficult	1

12. Where did you hear about the new PREFORMED Communications Tie?

Trade paper advertising	27
Saw tie at convention	14
Supplier	13
Manufacturer's representative	2
Other sources	2

13. Did you observe any signs of abrasion at insulators where old ties were replaced?

Considerable signs of abrasion	6
Some signs of abrasion	6
Few signs of abrasion	5
No signs of abrasion	4

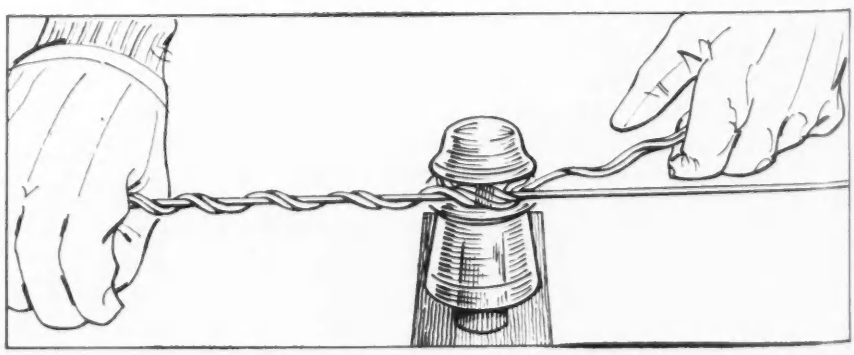
14. Do you intend to use more of the new Communications Ties?

Yes—33 No—0

15. Would you tell us of any safety suggestions that may have occurred to you after seeing and using the new Communications Tie.

(Answers to this question pointed out the safety features of the new tie. Following comments are typical:)

- No sharp ends on tie wires.
- Fewer puncture wounds with the new PREFORMED Tie.
- No tie wire ends to scratch the lineman or tear his clothes.
- The unbalanced holding feature would be a safety factor at road crossings or railroad crossings in case of wire breakage in adjacent spans.



Easiest tie to install.

16. In which storm loading area are you located?

Heavy	25
Medium	16
Borderline between medium and light	1
Light	9

Conclusions Drawn from Survey

The results of the survey reveal an enthusiastic acceptance of the Communications Tie by those who have used the new product. This is significant in view of the nationwide distribution of the questionnaire, the exceptionally good response, and the varying storm loading conditions of the areas in which the new ties were installed.

Some degree of wire abrasion at insulators was reported in over 80% of the instances where older type tie wires were removed. The line wires had been weakened in proportion to the extent of the abrasion. As a result, the lines could not utilize the full rated strength of the line wire under severe storm loading conditions.

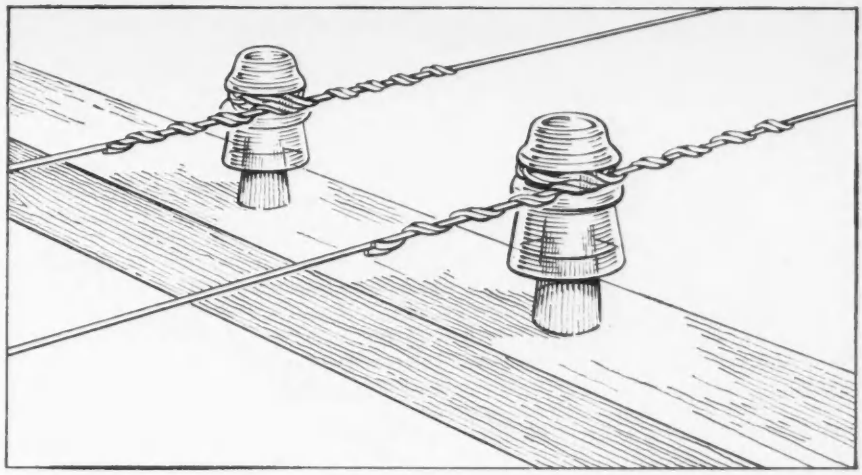
New Tie Eliminates Wire Abrasion at Insulators

The PREFORMED Communications Tie cradles the wire and prevents contact with the insulator. This fact was observed by over 95% of those who examined completed installations of the new tie. These lines should give trouble-free service for many years because they will not be weakened by premature abrasion.

New Tie Is Easy to Apply

Saving of installation time is another significant advantage of the new tie. Telephone plant men and engineers report these new ties can be installed in less time than any previous tie. Speed of installation is one way of expressing how easily the ties can be applied. Usually, a job is said to be easy if the work can be completed in a short period of time. On this basis the new PREFORMED Communications Tie is easy—very easy—to apply.

The PREFORMED Tie is designed for specific combinations of line wire and insulator sizes. The tie cradles and grips the wire to make the installation right every time. No special skill or training is needed to make every tie a good tie.



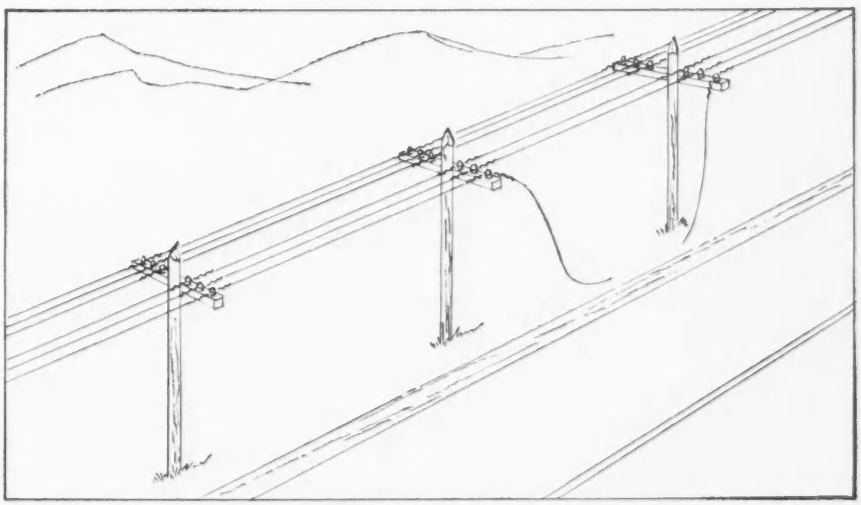
Every tie is a good tie.

Unbalanced Holding Feature Controls Wire

The unbalanced holding feature is an important plus benefit of the new PREFORMED Tie. The tie grips the wire. The grip becomes tighter if an attempt is made to pull the wire, in either direction, through the tie. Normally there is very little longitudinal strain at any given tie. However, slack off or running is prevented by the new tie if the tension in a span is released either intentionally or accidentally.

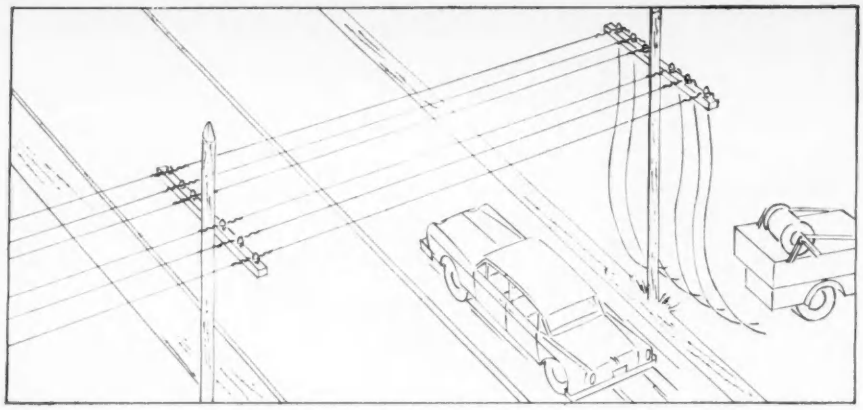
Some of the advantages of the unbalanced holding feature have been described as follows:

- "When replacing a deadend pole we let wire back against the PREFORMED Tie. Wire did not slack back into back sections. Therefore, considerable time and labor was saved on transfer of deadend pole."
- "Spans are held over highways while stringing rest of wire."
- "Trouble caused by a break in the line generally was limited to the span in which the break occurred."
- "Saves time and no slippage."
- "Wire was held in insulator after wire broke on one side."
- "We plan to use these ties in areas subject to high cross winds and sleet."



Unbalanced holding feature in action—wire does not sag off or run if span is broken or cut. This simplifies maintenance—saves money.

(ADVERTISEMENT)



Ties holding lines across highway.

Added Stability Strengthens Line

The strength of a pole line is cumulative. The entire line is strengthened as each span is strengthened. This is apparent when a line built with the new PREFORMED Tie is compared with a line tied with older type ties.

Older type ties were installed primarily to hold the line wire in the insulator groove. The tension of the wire was maintained by deadends or false deadends along the line. The individual ties provided little, if any, support to prevent the wire from sagging off if a wire should break. Thus, the points of stability were rather widely separated.

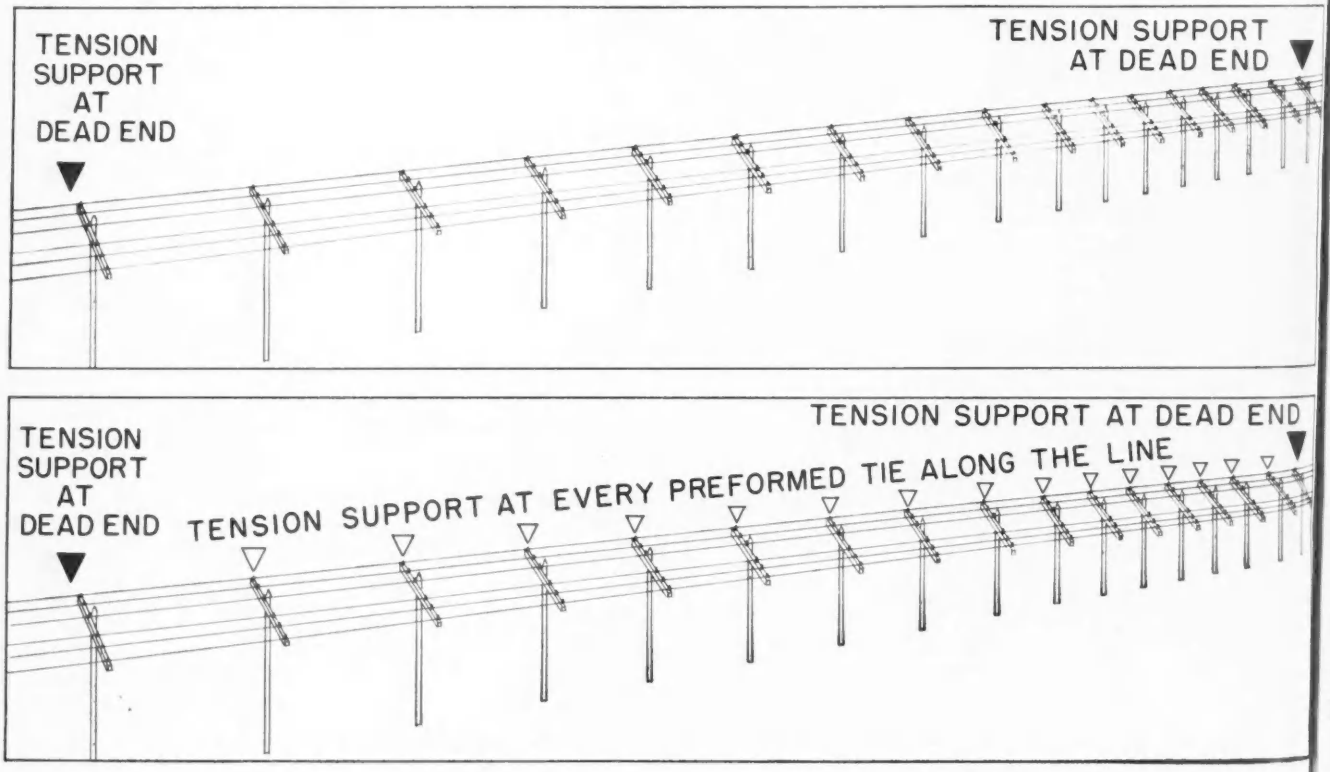
Compare the strength of a line having rather widely separated points of stability with a line having a point of stability at every pole. The new PREFORMED Communications Tie grips the wire at every pole. Each span is more or less independent of all other spans along the line. Field observations show that a wire break normally will be confined to the span in which the break occurred. Maintenance is easier and restoration of service is much faster.

Operating Companies Benefit from New Concept

The new PREFORMED Communications Tie introduces a new concept of open line wire construction which can benefit any telephone operating company. Basically, this new idea is the overall improvement of open wire lines through use of the new PREFORMED Tie. Briefly, these improvements are:

- Stability all along the line.
- Elimination of abrasion at insulators.
- Unbalanced holding feature at each tie.
- Rapid installation.
- No previous experience required to make every tie a good tie.

Today's new stronger line wires are built for longer spans. This means fewer poles and important savings in installation costs. The new Communications Ties strengthen the line at each pole. These factors add up to stronger lines that cost less to install and require less maintenance than ever before. These are sound reasons why open wire lines are today's best buy for many exchange and trunk lines.


TENSION SUPPORT AT DEAD END
TENSION SUPPORT AT DEAD END
TENSION SUPPORT AT DEAD END
TENSION SUPPORT AT EVERY PREFORMED TIE ALONG THE LINE
TENSION SUPPORT AT DEAD END

Positive grip of PREFORMED Communications Tie at every pole strengthens entire line and provides uniformity of completed assemblies all along the line.

NEXT STEP
TO A
GOOD TIE

WRITE OR PHONE

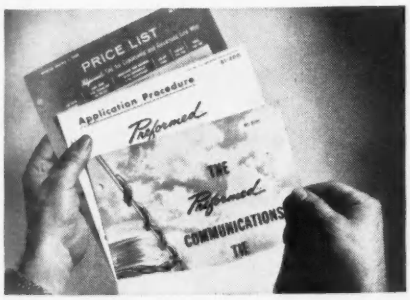
PREFORMED
LINE PRODUCTS COMPANY

5349 St. Clair Avenue
Cleveland 3, Ohio • EX 1-3571

ASK FOR THE

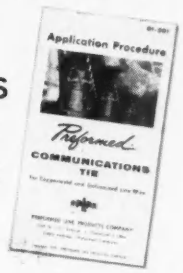
Preformed CT
TRADEMARK
SAMPLE KIT

Preformed CT
TRADEMARK
DATA FOLIO



Preformed CT
TRADEMARK

APPLICATION
INSTRUCTIONS
FOR POCKETS
OR PRACTICES
HANDBOOKS



is a trademark which is registered in the U. S. Patent Office and is the property of Preformed Line Products Company.

"Functions Of Traffic"

(Continued from page 48)

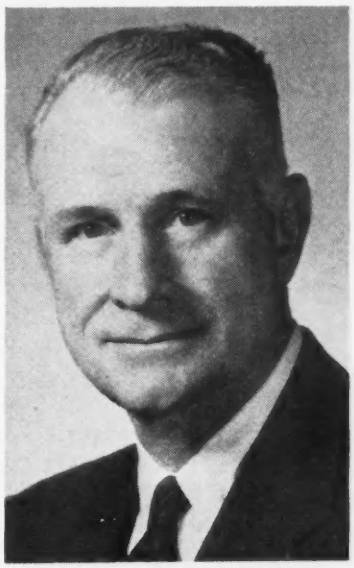
you are measuring up? Are you depending on your subscribers to tell you? Most of them won't until your service is so completely bad they can't stand it anymore. During the next 10 years I think it is a Traffic function to appraise every item of service — and take the necessary action to provide whatever is necessary.

The appraisals should include not only the speed of service but the quality as well. On operator handled toll you need the speed of answer (which ties in directly with force adjustment). How many mistakes do your operators make in reaching wrong numbers, recording wrong calling numbers? Are you sure your transmission levels are satisfactory? How much time is wasted by operators using irregular practices? How is your subscriber's service affected by equipment difficulties in some other company's office? Are your operators timing toll tickets accurately?

Now let's look at the "self-service" part of the business. Do your subscribers always wait for dial tone before dialing? Do they all know what digits must be dialed? Do they consult their directories or do they call hit or miss disturbing other subscribers with wrong numbers? What is your speed of dial tone? Are you encountering paths busy in your machine? What part? Does the subscriber reach a wrong number because the equipment didn't function properly?

These same questions can be applied to DDD operations. Where you have operator identification I can think of a few other questions. For example I've been told there is a problem of wrong calling numbers. Why? Does the customer give a wrong number? Does the operator key the wrong one? Does the equipment fail to record properly?

Let's not miss the point that we need some answers to questions concerning information and intercept also, but I don't want to bore you. I do want to make a point that we



USITA Traffic Conference Speaker W. A. KERN, president, Rochester (N. Y.) Telephone Co.

could go on and on with such questions but you can't give the answers without having some form of service appraisal.

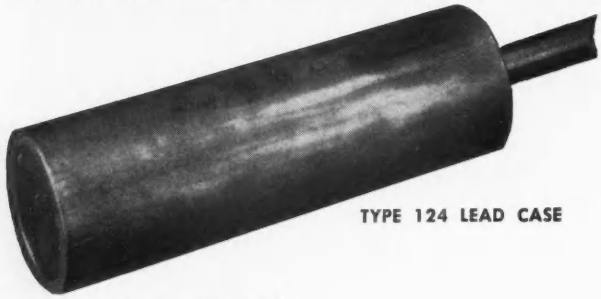
I've mentioned force adjustment and its importance. Wouldn't it be rather foolish to spend a lot of operator and supervisory time working on the wrong items? This can happen unless you have a program. In the next 10 years such a program is a vital Traffic function.

The Training Program

WHEN I mention the subject of training, I'm making it all inclusive, from the initial training of an operator to follow-up training of General Traffic Managers. (I stopped with General Traffic Managers only because this is a Traffic Conference but I think it is apparent that if some of the functions I mention are to be carried out you Traffic people must train some General Managers and some Presidents also.)

In mentioning training, I'm making the assumption that you are obtaining qualified people, because if you are not, no amount of training will compensate for the lack of such people. If you can find qualified people I think the training interval for operators can be shortened and you

CEECO TYPE C124
LEAD CASE ASSEMBLIES
FOR AERIAL (STRAND) MOUNTING
CONTAINING FOUR TO SEVENTY-SIX COILS



TYPE 124 LEAD CASE

- LEAD STUB ASSEMBLIES ARE PRESSURIZED
- PLASTIC STUB ASSEMBLIES ARE SEALED IN THERMOPLASTIC COMPOUND TO INSURE PROTECTION FROM MOISTURE.

These assemblies can be equipped with voice frequency coils, Types C632 (88 MH) and C638 (44 MH) coils are for subscriber loading. Types C642 (88 MH) and 641 (44 MH) coils are available for use on quadded inter-office and toll cables. (Also available with MF10 and MF11 units.) Special Coils can be made to meet other requirements.

Write us for assistance on your loading problems.

CEECO loading coils are sold by your telephone equipment supplier.

COMMUNICATION EQUIPMENT & ENGINEERING CO.

5646 West Race Avenue • Phone EStebrook 8-3109 • Chicago 44, Illinois

New New — New New — New New Write for Sample

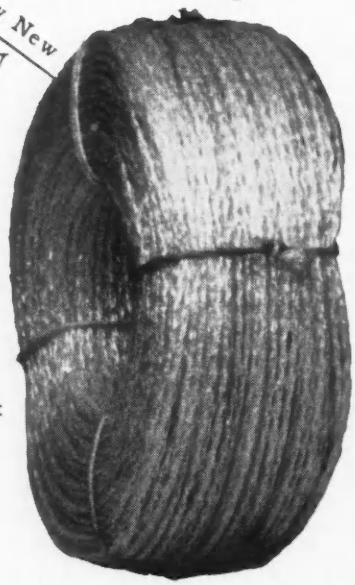
A Revolutionary NEW

LASHING

MATERIAL

You'll be surprised at its Light Weight

You'll be amazed at its Strength



Cable Spinning Equipment Company

3100 Topeka Avenue

CE 2-7234 or CE 2-7235 Topeka, Kansas

will at the same time develop the nucleus of a good supervisory organization. Training is of the utmost importance in the Central Office organization — but it has just as much importance in the way you do your statistical work, your traffic engineering, and your force adjustment.

As I see the training job of the next 10 years it includes not only the way to get the job at hand done but also the constant challenge of the job ahead. It means training people to think, to sponsor new ideas, and to have no fear of controversy.

In the historical part of this talk I referred principally to changes in our operating practices. Perhaps reference to practices is a good way to conclude my remarks also. Generally speaking Independent companies have sat back and accepted Bell System practices. There is no reason why Independent companies cannot pioneer. If one of your operators has an idea about a practice change that helps toward better customer understanding or speedier service try it out and if it is good recommend it. For example, someone must discover practices that will reduce the abuse of our Person traffic as well as our Collect, Third Number, and Credit Card practices.

I fully believe that a great deal of the success of our industry depends on how well the Traffic Department manages the handling of the company's product — telephone messages — over the next 10 years. Traffic engineering, force adjustment, practice improvements, service appraisal, and training all play their parts in doing the job properly and well. — *William A. Kern.*

Relay Booklet

A COMPREHENSIVE and informative booklet on "How to Adjust and Maintain Relays" has recently been issued by P. K. Neuses, Inc. It contains 8 pages of detailed instructions with line drawings to make it easy for the maintenance man to carrect relay difficulties.

Copies may be obtained by writing *P. K. Neuses, Inc.*, 511-21 *N. Dwyer St., Arlington Heights, Ill.*

"Cohesion"

(Concluded from page 40)

over the many years of experience how valuable a good trade organization is to the industry. Many of you REA borrowers are well aware of the outstanding job done this past year by the National REA Telephone Borrowers Committee in working with the commercial REA borrowers in gathering information to present to Congress for adequate appropriations and low interest rates for the REA program.

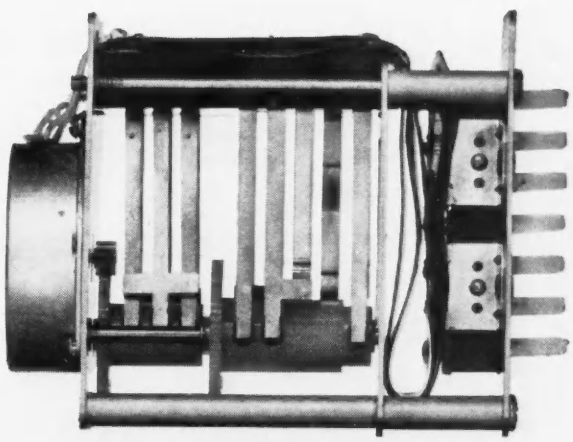
Many of the cooperative borrowers here today recognize the advantage of cooperating with the National Rural Telephone Cooperative Association which likewise has done an outstanding job in presenting the cooperative needs to Congress. There are other trade organizations which many of us belong to such as our state associations and regional associations. All of these tend to bring forth experience of other like companies so that we can grow in this communication industry.

In closing, I would like to say that in the few short years that I have been connected with the telephone industry, I have found it to be one of the best cooperating enterprises in America today. Yet in going through the history and recorded documents on file in our National office, I find that our problems are somewhat the same as they were 50 years ago but are just on a little more complex and on a little higher plane. We must have cooperation from the manufacturers, distributors, suppliers, contractors, engineers, union leaders, our employes, congressional delegates and our own company policies so that our ultimate subscriber will benefit from the lowest possible rate and the highest quality service the telephone industry is able to provide.

So you can see that cohesion, which means "sticking together" and cooperation, which means "working jointly" have great significance to us today and I am sure that as we go into the balance of this convention we will all benefit from the things we learn here together. — *Harold C. Ebaugh.*

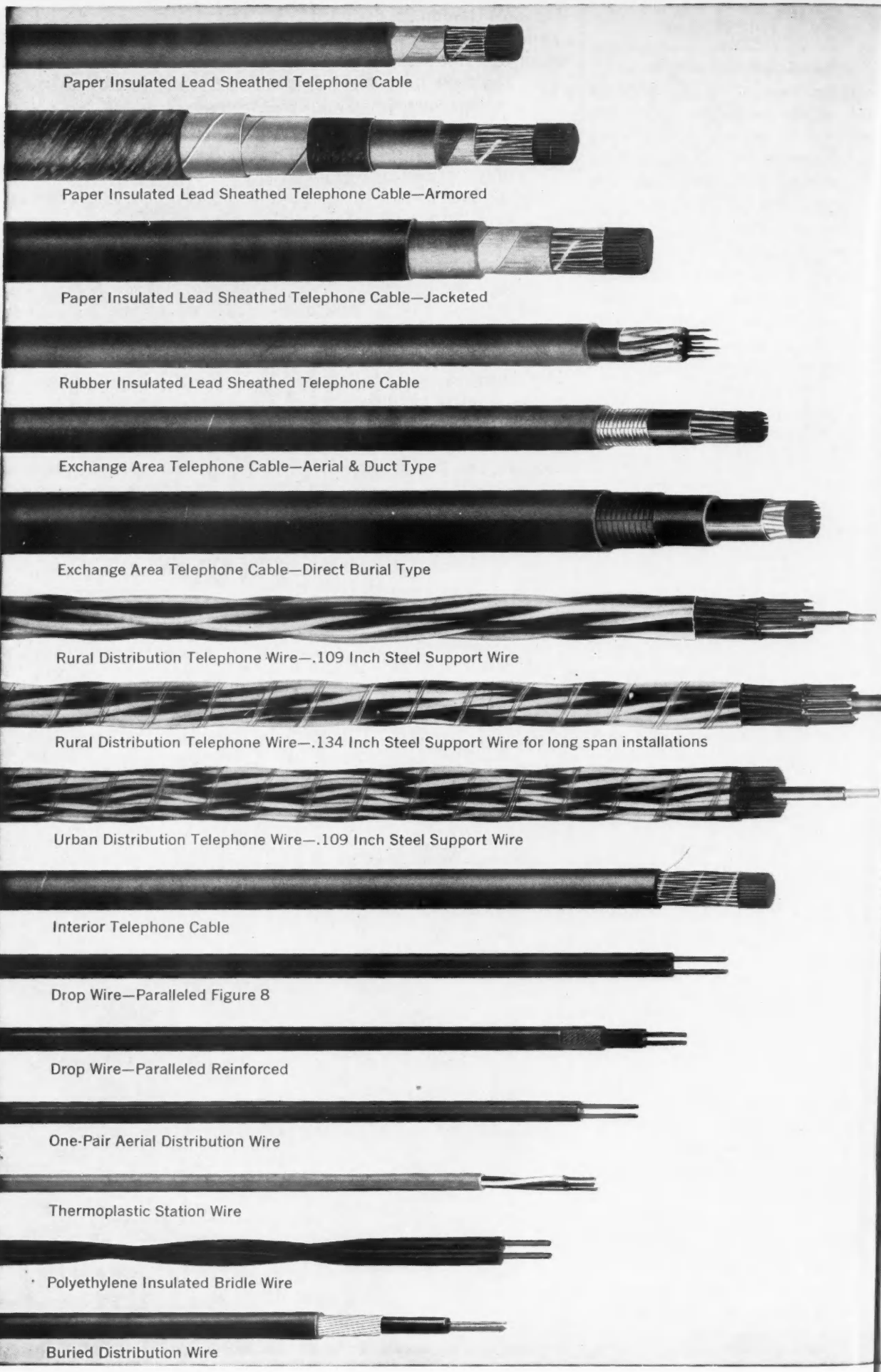
LONG LIFE LOW COST REPEAT CYCLE TIMERS

The A. W. Haydon Co. designed this series of repeat cycle timers for engineers with tricky timing problems and tight budgets. The low unit price on quantity runs will surprise you...and the savings we can offer on very large volume production sometimes surprises us! ■ Yet there has been no sacrifice in quality...it's all in the design. Special spring switches are supported in molded contact blocks; cams, cam followers and gears are molded nylon for long service life and extremely quiet operation. Two printed circuit cables supply internal wiring to 12 output circuits, and parallel cam shafts provide two cycling speeds. ■ The A. W. Haydon Co. has designed this repeat cycle timer to operate continuously for at least one year, but it will actually run for much longer. ■ The unit shown operates at 115V, 60 CPS, 2.5 watts power input. Its switch has been tested for 2 years (125 million cycles at 2 amps resistive 10VAC, 60 CPS) and is rated for 2.5 amp or a 7.0 amp inrush lamp load. ■ To be sure, other variations are available. A. W. Haydon will be delighted to quote these long life, low cost repeat cycle timers in any one of 125 standard speeds, 5 voltage ratings and 3 power supplies. All have Jones type terminal plugs for fast installation, and a quick-change motor mounting for ease of motor replacement. A clear plastic dust cover helps reduce noise level to a whisper. Write for information on your particular requirement.



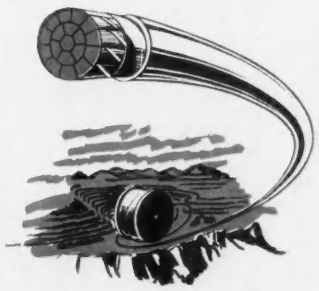
THE AWH AYDON COMPANY

264 North Elm Street, Waterbury 20, Connecticut


Paper Insulated Lead Sheathed Telephone Cable
Paper Insulated Lead Sheathed Telephone Cable—Armored
Paper Insulated Lead Sheathed Telephone Cable—Jacketed
Rubber Insulated Lead Sheathed Telephone Cable
Exchange Area Telephone Cable—Aerial & Duct Type
Exchange Area Telephone Cable—Direct Burial Type
Rural Distribution Telephone Wire—.109 Inch Steel Support Wire
Rural Distribution Telephone Wire—.134 Inch Steel Support Wire for long span installations
Urban Distribution Telephone Wire—.109 Inch Steel Support Wire
Interior Telephone Cable
Drop Wire—Paralleled Figure 8
Drop Wire—Paralleled Reinforced
One-Pair Aerial Distribution Wire
Thermoplastic Station Wire
Polyethylene Insulated Bridle Wire
Buried Distribution Wire

FOR PRODUCT DEPENDABILITY... SPECIFY

PHELPS DODGE
TELEPHONE WIRE & CABLE



... the "mine-to-market" quality line!

Behind the rugged dependability and high quality of Phelps Dodge telephone wire and cable are years of experience and research in the design and manufacture of communication cables.

Phelps Dodge pioneered the use of lead, paper, rubber and thermoplastics as applied to wire and cable. This valuable background of knowledge is combined by Phelps Dodge with highest grade materials and controlled craftsmanship in fabrication. The result is a complete line of reliable telephone wire and cable that helps reduce maintenance costs and provide longer in-life service.

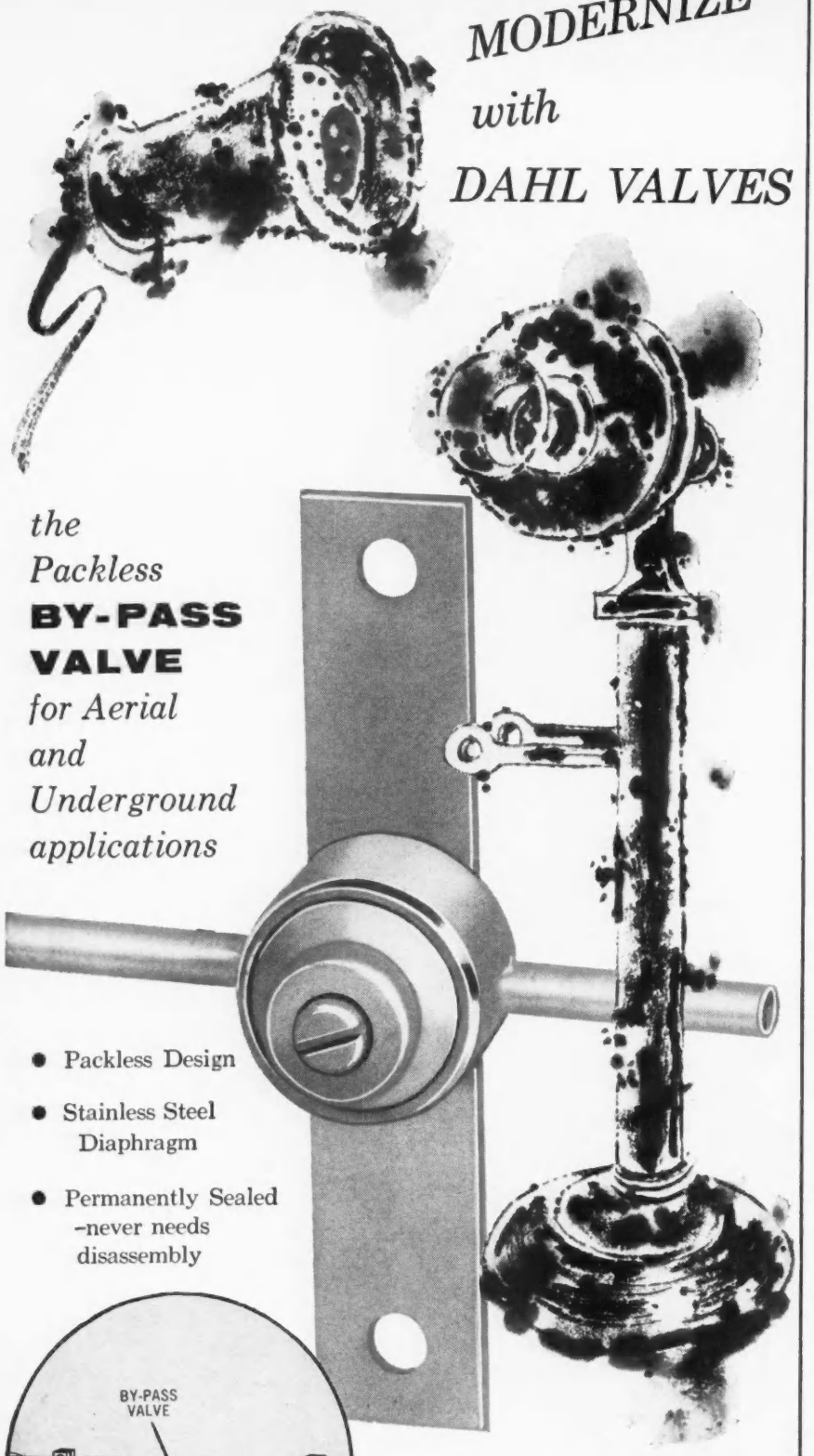
Phelps Dodge will be glad to help you fill your wire and cable requirements. Get in touch with your nearest Phelps Dodge sales office.

PHELPS DODGE COPPER PRODUCTS CORPORATION

PD

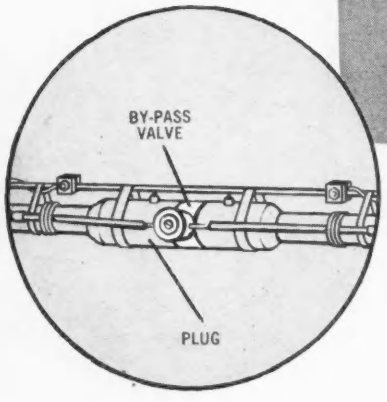
SALES OFFICES: Atlanta, Birmingham, Ala., Cambridge, Mass., Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Dayton, Denver, Detroit, Fort Wayne, Greensboro, N. C., Houston, Indianapolis, Jacksonville, Kansas City, Mo., Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Tampa, Washington, D. C.

MODERNIZE with DAHL VALVES



the Packless **BY-PASS VALVE** *for Aerial and Underground applications*

- Packless Design
- Stainless Steel Diaphragm
- Permanently Sealed –never needs disassembly



CALL OR WRITE FOR CATALOG T-1
CLIFFORD 3-9500
86 TUPELO STREET, BRISTOL, RHODE ISLAND

GEORGE W. DAHL COMPANY INC.

VALVES AND CONTROLS FOR COMMUNICATIONS, PROCESS, AIRCRAFT AND MARINE INDUSTRIES

M. P. Brown Joins Escambia Treating Co.

M. P. BROWN has been appointed assistant to the president of the Escambia Treating Co., Pensacola, Fla. Brown resigned as vice president of sales, Taylor-Colquitt Co., effective June 1, 1960, after 35 years of service with that firm. He had served successively in treating and sales departments and was in charge of eastern sales for several years prior to his election as vice president.

Brown is a prominent member of the American Wood Preservers' Ass'n. and a director of the American Wood Preservers Institute.

Calif. Water & Tel. Co. Advances Landrus

RUSSELL R. LANDRUS has been appointed to the newly created position of director of information for California Water & Telephone Co. In this capacity, Landrus will be in charge of the company's telephone advertising program as well as its public and employe information services.

Landrus began his telephone career in 1924 with the Illinois Bell Telephone Co. in Decatur Ill. Subsequently, he worked with the Ohio Bell Telephone Co. as a cable-splicer's helper, and with the AT&T cable department. In 1928, Landrus returned to Illinois Bell in Evanston, Ill., as an assignment clerk and participated in the company's dial conversion program.

Three years later he interrupted his telephone career and entered the wholesale bakery business. Following the outbreak of World War II, he served in the U. S. Navy for four years.

Landrus joined California Water & Telephone Company in 1946 as a central office equipment installer. He later served as PBX supervisor and commercial supervisor for the company's Palm Springs district.

In 1955, Landrus was appointed sales supervisor for the company's telephone division. As such he was responsible for developing and directing the division's sales and merchandising program. He continued in this capacity until his recent appointment as director of information.

SERVICE PRUZAN

only the spelling is different...
the words stand for the same thing

PRUZAN *means* SERVICE

Greatest stock of all materials
in the Pacific Northwest
"Everything for the Line and Lineman"

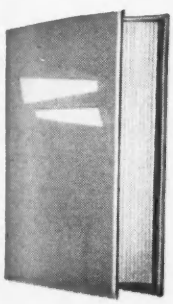
Pole Line Material • Safety Equipment
Wire • Cable • Strand
Splicing Materials • Tools

Call or Write for our catalog and stock list.

Jack Pruzan Co.

MAin 4-6505 • 1963 1st AVE SO. • SEATTLE

Solve electronic control circuit problems fast!



Diagrams and analyses of 267 actual basic circuits

Everyone concerned with the design or adaptation of electronic control circuits will find immediate and frequent use for this handbook. It compiles over 250 important electronic control circuits, each complete with values of components . . . clearly-drawn diagrams . . . and to-the-point discussions of how the circuit works.

Advances in the field are thoroughly covered to show the present state of the art of circuitry in such areas as alarm circuits, audio control circuits, computer control circuits, machine control circuits, magnetic amplifier circuits, nucleonic circuits, process control circuits, servo-mechanism circuits, & switching circuits.

Just Published — **Handbook of ELECTRONIC CONTROL CIRCUITS**

By JOHN MARKUS, Electronic Consultant

360 pages, 8¼ x 11, 267 diagrams, $8.50

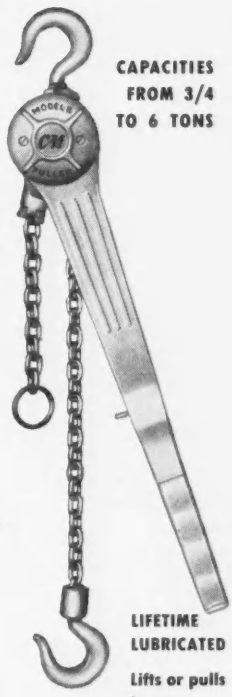
In the fact-packed pages of this handy reference you'll find a ready source of information about the circuits you need for any electronic control application. It contains all types of circuits — from counting to welding control, both simple and advanced.

For each of the scores of circuits, the handbook brings you the values of all the important components to help you read the circuit and redesign it for your own use. With these data as your starting point, you can easily adapt any circuit to your need.

Educational Division
TELEPHONE ENGINEER PUBLISHING CORP.
7720 N. Sheridan
Chicago 26, Ill.

CM PULLER

for RUGGED STRENGTH and GREATEST NUMBER of USEFUL FEATURES



CAPACITIES FROM 3/4 TO 6 TONS

SMOOTH OPERATION
Easy operating, accurate spotting, effortless lowering.

POSITIVE BRAKING
Holds load automatically with non-slip action.

RUGGED CONSTRUCTION
Built of heat treated alloys of steel and aluminum.

SUPER-STRENGTH CHAIN
Famous CM-Alloy link chain; long-lasting, non-kinking, self-cleaning.

LIFETIME LUBRICATED

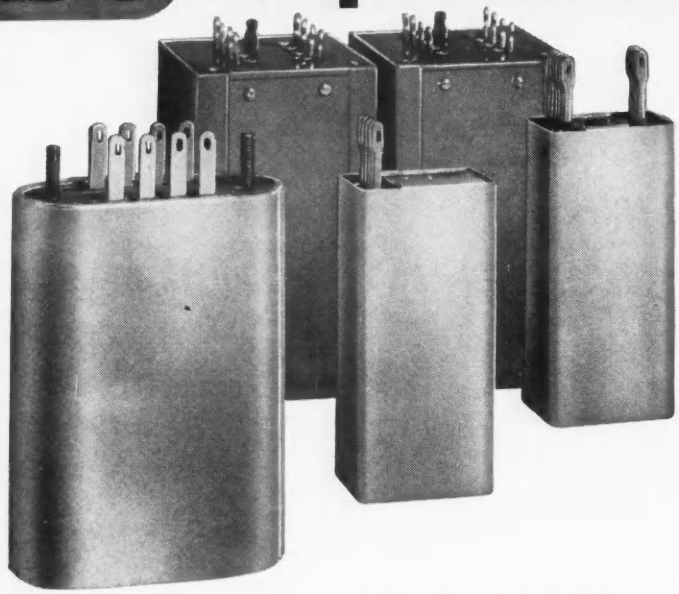
Lifts or pulls in any position

• Send for bulletin and name of your local distributor

CM® HOISTS

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CORPORATION
TONAWANDA, NEW YORK
NEW YORK • CHICAGO • CLEVELAND
In Canada: Columbus McKinnon Limited, St. Catharines, Ontario

ADC Telephone Coils



Many are in stock. All are electrically and physically interchangeable with Western Electric. You'll like ADC's price and delivery.

Write for Telephone Coil Literature.

ADC INCORPORATED

2846-13TH AVENUE SOUTH • MINNEAPOLIS 7, MINNESOTA

PACIFIC BRANCH *North Hollywood, California*

TRANSFORMERS • REACTORS • FILTERS • JACKS AND PLUGS • JACK PANELS

CONDEX* MULTIPLE CONCRETE CONDUIT

SPOTTING OF CONDUIT ALONG RIGHT-OF-WAY ADJACENT TO PROPOSED TRENCH

Special fittings — miters — —short lengths — expanded web sections available, also adapters to claytile, transite and fiber duct.

American Concrete Pipe Co., Sub. of Am. Pipe and Construction Co., 2025 S. 7th St., Phoenix, Ariz. Tel: AL 2-7566
American Pipe and Construction Co., 4635 Firestone Blvd., Southgate, Calif. Tel: LOrain 4-2511
American Pipe and Construction Co., 101 Alquire Rd., Hayward, Calif. Tel: JEfferson 7-2072
American Pipe and Construction Co., 518 N.E. Columbia Blvd., Portland, Ore. Tel: BUtler 5-2531
Concrete Conduit Corp., 130-01 Northern Blvd., Corona, N. Y. Tel: ILlinois 7-1515
Chicago Pre-Cast Products Corp., 29W629 North Aurora Rd., Naperville, Ill. Tel: ELmwood 5-2700—2701
Denver Concrete Products Co., 5020 Marshal, Arvada, Colorado. Tel: HA 2-4202
Eastern Pre-Cast Corporation, 675 Main St., Tullytown, Pa. Tel: Windsor 9-3750
Elmore Concrete Products Co., Division of North Star Concrete Co., Elmore, Minn. Tel: ELmore 52
J. E. Evans Concrete Products Inc., Cleveland, Ohio. Home Office: Indianapolis, Ind. Tel: WAlnut 5-5301
J. E. Evans Concrete Products Inc., Shelbyville, Ind. Tel: WAlnut 5-5301
Neff Concrete Products Co., 711 Section St., Danville, Ill. Tel: Danville 1016
PRE-CON Limited, Orenda Rd., Brampton, Ontario, Canada. Tel: HUdson 1-3492 (Toronto)
Pre-Con of Quebec, Ltd., Montreal, Quebec, Canada. Home Office: Brampton, Ont. Tel: HUdson 1-3942 (Toronto)
T.E.L. Pre-Cast Products Corp., 1 Industrial Ave., Edgewater, Florida. Tel: GArden 8-9881
Utah Concrete Pipe Co., 379—17th St., Ogden, Utah. Tel: EXport 9-1171
For information regarding CONDEX* Multiple-Duct Concrete Conduit, call or write your local producer, or the parent company.

*Registered Trademark

CONDEX

GAGNE ENTERPRISES, INC.

29W 629 NORTH AURORA ROAD

NAPERVILLE, ILLINOIS

NAPERVILLE 2700-2701

From 12,000 to 50,000 stations in 10 years is a remarkable record even for such a fabulous a city as Las Vegas, Nevada. FRANK A. DRESSLAR, SR., president of the Southern Nevada Telephone Co., is shown presenting the "milestone instrument to Mr. and Mrs. CLYDE SEABAUGH. Daughter THERESA LEA is probably one of the first to use a Stromberg-Carlson "Petite" telephone in the state of Nevada. The Southern Nevada Telephone Co. now serves over 40 per cent of the total number of telephones in the entire state.

"Public Service"

(Continued from page 31)

Insurance companies and trust funds do not have staffs of qualified telephone personnel to determine whether such high debt ratio loans are feasible nor to supervise the loan after it is made to see that it remains feasible and solvent. REA has set up such an organization and that is the basic reason that the government, acting through REA, can make loans totaling more than 60 per cent of the capital assets without undue risk to the government or the borrower.

Another question with respect to REA loans often discussed is the two per cent interest rate. It is a fact that the current cost of money to the government is greater than two per cent, yet it is my judgment that the two per cent rate of interest on loans for the development of rural telephone service is justifiable.

In the first place, rural telephone development at this time cannot generally be undertaken by Independent telephone companies with funds costing in excess of two per cent. The average cost of facilities to serve rural people is such that the rates for service would be prohibitive if the cost of the capital exceeded 2 per cent. The accounting system of the government does not reveal the fringe bene-

AT & T Requests FCC Approval of Plans For Communications Satellite Systems

AMERICAN Telephone & Telegraph company said October 21 it hopes to put up within a year the first commercial space satellite as the forerunner of a communications relay network in the sky.

The orbiting sphere would be used to transmit telephone calls, television, and other types of communication among the United States, Britain, and Europe.

The initial transmissions would be experimental. After satisfactory tests, the company said, commercial service would be offered to the public.

A. T. & T. applied to the Federal Communications commission for authority to go ahead with the project. It said it is ready to contract for launching of the satellite and to begin construction of ground transmission and receiving stations.

T. Keith Glennan, administrator of the National Aeronautics and Space administration, has said NASA will make available to private companies at cost rockets, launching, and tracking facilities and technical services. A. T. & T. said it would work closely with NASA.

The only artificial earth satellites launched thus far have been under government control by this country and the Soviet Union.

A. T. & T. made no estimate of the total costs of the project, which it said it will finance and operate in coordination with telephone administrations board.

It said the system it contemplates will include an unspecified number of satellites, and that when they are in production the cost to put each one into space will be about a million dollars.

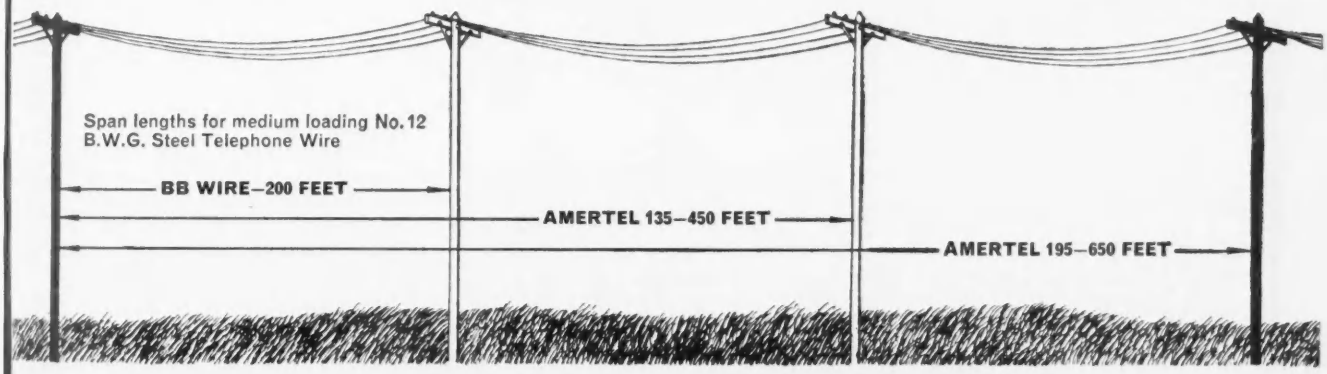
The satellites A. T. & T. proposes will orbit at an altitude of 2,200 miles and will be powered by solar batteries, which convert rays of the sun into electrical energy.

"Electronic amplifiers aboard the space stations would catch signals from the earth, immediately boost (amplify) them and relay them on to ground stations in the United States, Britain, and western Europe," the company said.

The proposed satellites will contain electronic relay equipment, and thus are called active space vehicles in contrast to the passive "project echo" which merely bounces signals off its surface.

The spheres would be four feet in diameter and weigh about 175 pounds, with 60 per cent of the surface being covered with solar cells.

"We believe the commercial application of satellite communications is a job for private enterprise," A. T. & T. Vice President Henry T. Killingsworth said. "This new project is still another indication of our readiness to take on that job and pay our own way."



It's true...Amertel 195 has tripled span lengths!

In medium loading areas, the old 12 gauge BB Wire could be installed in spans of 200 feet using about 27 poles to the mile. Now, with the new extra-high-strength USS Tiger Brand Amertel 195, you can use spans of 650 feet with only 9 poles per mile. Of course, rough country may increase the number of poles somewhat, but the savings in poles and other equipment are obvious.

Amertel 195 has other advantages too:

- Greater strength increases its ability to withstand ice loading. This wire has been known to touch the ground under severe icing conditions without breaking.
- Better voice transmission efficiency
- Reduced installation costs

More information—free! Just write for our booklet, "Amertel 195," American Steel & Wire, Dept. 0416, 614 Superior Ave., N. W., Cleveland 13, Ohio.

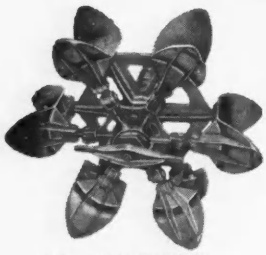
USS **American Steel & Wire Division of United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad

USS, Tiger Brand and Amertel are registered trademarks

GENERAL MACHINE PRODUCTS COMPANY, INC.

Old Lincoln Highway at Pa. Turnpike, Trevose, Pa.

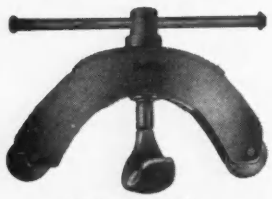


C-R POWER REEL

GMPCO

AERIAL TENTS
CABLE BENDERS
CABLE BLOCKS
CABLE LASHERS
COAXIAL CABLE TOOLS
LASHING WIRE
CLAMPS AND GRIPS
PORTABLE & POWER REELS

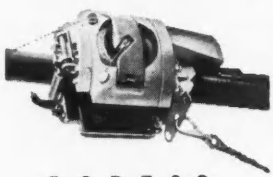
PRESSURE TESTING KIT



SLACK PULLER

COMPOUND

CABLE FEEDER



B, C, D, E, & G CABLE LASHERS

Special Purpose Tools To Specifications — Catalog on Request

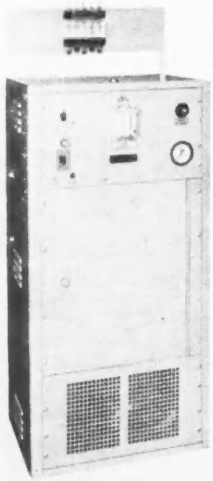
Over 600 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate shipment

reduce trouble reports

MODEL RC
DEHYDRATOR
automatic in operation

- Hi-Lo pressure switch for alarm
- Humistat for alarm above 4% Relative Humidity
- Power failure relays and separate fustat
- By-Pass Valve & alarm for excessive Relative Humidity
- Mechanical control valve for stand-by air supply (dry nitrogen) in event of power failure
- Additional safety features on air compressor
- Power supply is 115 volt, AC on the Dehydrator and Air Compressor

order through your favorite distributor
for information, write or phone



S & G

Used for pressurizing aerial and underground telephone cables, the Model RC Dehydrator Automatic is designed for small installations of 80 to 100 miles of cable. It is a floor mounted unit. Operating voltage is 115/220 volts, 1 phase, 60 cycle, and the output is 700 standard cubic feet per day maximum, with dewpoint of — 70°F.

S & G MANUFACTURING CORPORATION

DESIGNERS AND MANUFACTURERS OF
SPECIAL EQUIPMENT FOR UTILITIES AND CONTRACTORS
1017 Magazine St. • P. O. Box 1309 • New Orleans 10, La. • JA 5-3142

fits which the government derives from the circulation of telephone loan funds advanced by REA. All such funds are disbursed by the borrowers soon after they are advanced and immediately start circulating. Each time the money changes hands the treasury department derives a substantial part in corporate and personal income taxes which probably exceeds by a considerable amount the loss which the government sustains in making two per cent telephone loans. In addition to these fringe benefits to the Treasury, the standard of living of many people is greatly elevated.

In the course of time these REA telephone borrowers will saturate their communities with adequate telephone service. Their level of income will increase through increased density of subscribers and through education and ability of the subscribers to pay better rates for the service. When that point is reached some years hence, there will be no further need for the government to make loans for rural telephone development at a rate of interest lower than its current cost of money.

REA has made telephone loans in all states of the union except Connecticut, Delaware, Hawaii and Maryland. Applications for loans have been received from the Virgin Islands and Puerto Rico. Despite the remarkable progress that has been made in the development of rural telephone service since the advent of the REA telephone loan program in 1950, there is still much more to be accomplished.

A large number of Independent telephone companies still operate manual systems. The manual system is marked for extinction. The cost of operators to switch telephone traffic manually is becoming more and more prohibitive each year. The program of the industry to establish long distance dialing by the operator at the office of origin and by the subscriber cannot be made fully effective until every telephone exchange in the nation has been converted to dial operation and equipped for toll dialing.

It is going to be most difficult for a large majority of the Independent telephone companies to finance the conversion of their systems to dial op-

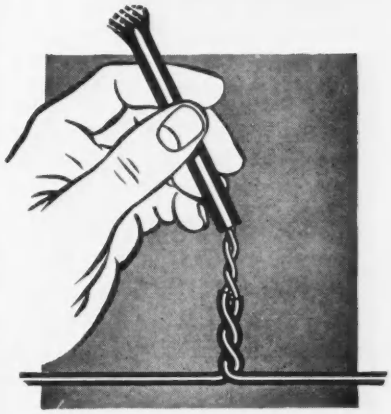
"Off The Board"

Communications Securities

Markets as of October 12, 1960	DIVIDEND	BID	ASKED	LAST SALE
American Tel. & Tel. Co.	3.30			92⅝
Anglo-Canadian Tel. Co. (Br. Col-Dom. Rep.)	1.20	35	37½	
Bell Telephone Co. of Canada	2.20			47⅛
British Columbia Tel. Co.	2.20	47	47	
Calif. Interstate Tel. (Calif., Nev.)	.70	13	14	
Calif. Pac. Util. (Calif., Nev., Ore.)	90	21½	23	
California Water & Tel. Co.	1.36	29½	31	
Carolina Tel. & Tel. Co.	1.60	40	45	
Central Elec. & Gas Co.	1.20	27	29½	
Central Tel. Co. (Minn., Ia., N. C.)	.88	22	23½	
Chenango & Unadilla Tel. (N. Y.)	1.20	26	27½	
Cincinnati & Suburban Tel. Co.	4.50	93	96	
Citizens Util. Co. (Calif., Pa.) "A"	stk. only	19⅛	20⅝	
Citizens Util. Co. (Calif., Pa.) "B"	.48	17	18½	
Commonwealth Tel. Co. (Pa.)	1.00	20½	22½	
Florida Tel. Corp.	1.00	27	29½	
General Tel. & Electronics Corp.	.76			26⅝
Hawaiian Tel. Co.	1.00	22¼	23¾	
Independent Tel. Co.	none	8	8¾	
Indiana Tel. Corp.	.50	23½	26	
Inter-County Tel. & Tel. Co. (Fla.)	.72+stk	23	25	
Inter-Mountain Tel. Co. (Va., Tenn.)	.80	15¾	17	
Jamestown Tel. Corp.	5.60	85	89	
LaCrosse Tel. Corp.	.80	15½	—	
Lincoln Tel. & Tel. Co. (Neb.)	2.60	64	69	
Lorain Telephone Co. (Ohio)	1.40	32½	—	
Middle States Tel. Co. (Ill.)	.80	25½	28½	
Mountain States Tel. & Tel. Co. (Ariz., Colo., Mont., Tex.)	.90	24¼	24½	
New England Tel. & Tel. Co.	1.72			37⅝
North Carolina Tel. Co.	none	1	1¼	
Northern Ohio Tel. Co.	2.00	52	55	
Pacific Tel. & Tel. Co.	1.14			27¼
Peoples Telephone Corp. (Pa.)	4.00	85	90	
Pioneer Tel. Co. (Minn.)	1.00+stk	35	37	
Rochester Tel. Corp. (N. Y.)	1.00			23¼
Southeastern Tel. Co. (Fla.)	1.00	21½	23	
Southern New England Tel. Co.	2.20	44¼	46¾	
Southern Nevada Tel. Co.	1.00	26½	28	
Southwestern States Tel. Co. (La., Ark., Okla., Tex.)	1.20	24½	26	
Telephone Service Co. of Ohio "A"	.36	29	31	
Telephone Service Co. of Ohio "B"	.36	29	31	
Tidewater Telephone Co. (Va.)	1.40	25	—	
Virginia Tel. & Tel. Co.	1.00	20½	23	
United Utilities, Inc.	1.40	44¼	46¼	
West Coast Tel. (Wash., Ore., Calif.)	1.28	26¾	28	
Western Union Telegraph Co.	1.40			45¼
Western Utilities Corp.	.36	8	8½	
Western Light & Tel. Co., Inc. (Mo., Kans., Ia.)	2.00	44½	47	

(Source of Market — DEAN WITTER & CO.)

Superior's "Super-Splice"® is safe and sure!



"Super-Splice" makes splices waterproof . . . from inside out!

Sealed at one end, this plastic splice sleeve is filled with an insulating and waterproofing compound.*

Economical "Super-Splice," a Superior exclusive, makes the splice permanently as good as the cable . . . yet it can be re-entered easily. The compound never hardens or oozes out no matter what the temperature.

Prevent leakage currents and breakdowns in the presence of moisture...good for 25,000 v.d.c. Order "Super-Splice" NOW!

*A Dow-Corning silicone compound.

An REA Standard.

"Super-Splice" is available for use with straight, butt or bridge splices.

For further information on economical "SUPER-SPLICE", write

SUPERIOR CABLE

SUPERIOR CABLE CORPORATION
Hickory, North Carolina

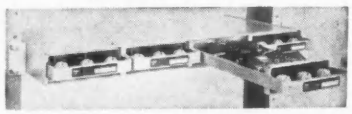
BUDELMAN bec

TYPE 251A

VOICE FREQUENCY REPEATER

A new exciting development from Budelman. Four of these new transistorized repeaters fit on a mounting shelf in only 1¾ inches of rack space.

(PATENT PENDING)



Up to 20 db gain in both directions. Battery drain from 12, 24 or 48 volt battery is only 3.4 milliamps. Low price, high reliability. Send for data sheets today.

BUDELMAN

ELECTRONICS CORPORATION

375 FAIRFIELD AVE. STAMFORD, CONN.

DISTRIBUTED BY: Buckeye Telephone & Supply Co., 1250 Kinnear Rd., Columbus 21, Ohio. Empire Telectronics, 5708 Balsam St., Arvada, Colo. The Engineering Service, Box 178, Butte, Mont. J. W. Flint, 325 Virginia, Ponca City, Okla. Nelson Electric Supply Co., 1123 Slocum St., Dallas 7, Texas. Somerset Telephone & Supply, North Anson, Me. SpaceCom, Inc., 2331 4th St., Santa Rosa, Calif. Tele-Radio Systems, Ltd., 3633 Dundas St., W., Toronto 9, Ont. EXPORT: Westrex Corp., 540 W. 58th St., New York 19, N. Y.

Thornhill Publishing Company

A Division of
Western Utilities Corporation

TELEPHONE
DIRECTORY
PUBLISHING

Selling — Printing — Engraving
Production — Distribution — Collecting
Counsel for Advertisers

OFFICES:

300 Montgomery Street, San Francisco 4, Calif.
2911 Bond Street, Everett, Washington
121 S.W. First Street, Beaverton, Oregon
116 South Rusk Street, Kilgore, Texas
130 East Lime Avenue, Monrovia, California

Call any of our offices
for a free estimate on your directory
potential *today*—no obligation!

eration without use of the REA telephone loan program. Therefore, I consider it expedient, for the industry and for the people, that the Congress make available to REA adequate loan funds at the present rate of two per cent per annum until such time as the rural telephone program has reached maturity and the borrowers are financially able to stand on their own feet and to qualify for commercial loans at the going rate of interest.

At the same time, I urge those companies that have not already arranged their finances for converting their manual systems to dial operation to take immediate steps for this progressive move and if they find it difficult to qualify for adequate commercial loans to complete their dial conversions that they take a good look at the REA telephone loan program as a satisfactory source of meeting their financial requirements. It is my opinion that only a few of the Independent telephone companies will be able to meet their financial requirements through commercial sources. The REA telephone loan program is no longer an experiment, it is well established, and its practicability has been proven. — *D. B. Corman.*

"Person Collect & Special DDD"

(Continued from page 29)

(12) *Called Number Re-entry*: — A means to put in a new, or corrected, called number.

(13) *Resending on Toll Line*: — A means whereby the operator can resend the called telephone number without re-keying or requiring the customer to redial.

(14) *Toll Line Release*: — The means for the operator to release the forward toll connection so that toll circuit time is not occupied while customer instructions or operator reports are being made.

(15) *Remove Audible Ringing*: — A means to remove audible ringing when it interferes with the operator obtaining details or instructions from the calling customer.

USITA Traffic Conference Speaker JOHN B. NOGGLE, division traffic manager, Virginia Tel. & Tel. Co., Charlottesville, Va.

(16) *Connection Splitting*: — The means to split the calling customer from the called customer when a delay is required after the called station answers.

(17) *Time Start*: — The means to start the equipment timing of conversation.

(18) *Time Stop*: — The means to interrupt timing of a conversation in the event of error or wrong party on the line.

(19) *Incomplete Information Guard*: — A safeguard against calls proceeding when equipment information is incomplete.

(20) *Operator Initiated or Subsequent Attempts*: — The means for an operator to access a recorder so that she can key in the necessary call details and have the equipment automatically send the call and record the subsequent message information.

(21) *Toll Switching Access*: — A means whereby the operator can recall the calling station through the DDD equipment.

(22) *Coin Control*: — A means whereby the operator can actuate coin collect or return through the DDD equipment.

(23) *Checking Operator*: — A checking operator obtains the calling telephone number and keys this number into the equipment.

(24) *Automatic Number Identifi-*

cation: — A means whereby the equipment automatically identifies and stores the calling telephone number.

(25) *Cordless Control Positions*: — Console type positions which provide all the control features required by the operator to control DDD calls.

(26) *Combination Cord Type Toll, DSA and DDD Control Positions*: — Existing toll positions that are modified for DDD control, and which have the capability for combined operation.

Central Telephone Company has been conducting a limited field trial of Person and Collect DDD in North Carolina since May, 1960. I would like to discuss some of our experience which I believe will be characteristic in every system developed.

Objective speed of answer for DDD control operation is in the neighborhood of three per cent over five seconds. Meeting this objective yields an average answer of one second. This is a substantial improvement over the present CLR objective of seven per cent over 10 seconds. Experience shows the customers recognize this speed as improved service and express it first in their comments.

Premium DDD control operation differs from normal CLR operation in that the work time on a call is continuous, except for Time & Charge, Notify, and overtime collection on coin traffic. This influences the per cent occupied time in the calculation of the coefficient and results in about 65 per cent occupancy to maintain the objective speed of service. Our service observations to develop work time coefficients by class of call produced the following results:

Class	Avertge Work Time Interval	Coefficient
Person-to-Person Paid	62 seconds	6.10
Person-to-Person Collect	73 seconds	7.17
Station-to-Station Collect	52 seconds	5.11

These coefficients were developed on an Automatic Number Identification system and should be increased .5 units per call where a checking operator must key the calling telephone number. Station-to-Station sent-paid traffic will also require the application of a coefficient of .5 per call if a checking operator is required. These coefficients are not adjusted for team size.

Per cent completion on Station-to-Station sent-paid DDD should be about 80 per cent. Person and Collect will develop a completion of about 50 per cent. The over-all completion should range between 50 per cent and 60 per cent depending on the ratios of attempts for the different classes of dialable calls. It should be noted that DDD completion is computed on an attempt basis and any comparison with equated studies must include initial and subsequent toll line attempts. Under the new peg count procedure the sum of busy and other reports would be the equivalent of total attempts.

Our experience in work time savings for Person and Collect traffic is approximately 50 per cent when related to work time per DDD network attempt. It is not prudent to rule of thumb the work time savings on a manual call basis because the ratios of different classes and their ratios of attempts will affect the result. The coefficients permit a more accurate individual office analysis.

At the present time over 3000 exchanges are included in the nationwide DDD network. These exchanges are equipped with ANC or 2-5 numbering and arranged with the required transmission, signaling and special features. They serve some 50 million telephones, which are about 70 per cent of the total stations in our nation.

DDD offers many direct and indirect advantages to the departments other than Traffic. Premium DDD extends Commercial services and Accounting efficiency to the heavy users of higher rated toll and to the consumers who require our essential services for their successful operations.

Some offices equipped with Premium DDD find about 95 per cent of DDD network traffic, from non-coin subscribers, is customer dialed. Significant too are findings that percentages of toll errors and adjustments for messages billed are related to the method of toll operation. AMA type DDD, which operates with automatic calling number identification, devel-

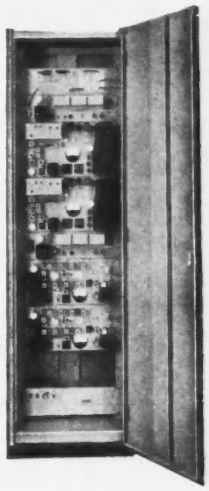
BUDELMAN bec

MICROWAVE

BUDELMAN POINT-TO-POINT RADIO SYSTEMS for the

- 2000 MC band
- 960 MC band
- 450 MC band

With capacity up to 30 voice circuits. Write today for technical data.



BUDELMAN

ELECTRONICS CORPORATION

375 FAIRFIELD AVE. STAMFORD, CONN.

DISTRIBUTED BY: Buckeye Telephone & Supply Co., 1250 Kinnear Rd., Columbus 21, Ohio. Empire Telectronics, 5708 Balsam St., Arvada, Colo. The Engineering Service, Box 178, Butte, Mont. J. W. Flint, 325 Virginia, Ponca City, Okla. Nelson Electric Supply Co., 1123 Slocum St., Dallas 7, Texas. Somerset Telephone & Supply, North Anson, Me. SpaceCom, Inc., 2331 4th St., Santa Rosa, Calif. Tele-Radio Systems, Ltd., 3633 Dundas St., W., Toronto 9, Ont. EXPORT: Westrex Corp., 540 W. 58th St., New York 19, N. Y.

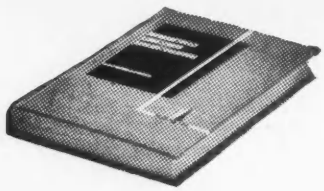
Universal Ground Anchors

Were created knowing that a device should be developed which would provide satisfactory ground anchoring facilities in all types of soil.

This Ground Anchor is the result and can be used in practically any soil. It may be quickly and easily installed and is very efficient. Send for Brochure.

BARTLETT MFG. CO.

3052 E. Grand Blvd., Detroit 2, Mich



Save time and work in engineering design

Just Published! Here's a practical manual of tested product-engineering aids to help you get quicker, easier solutions to everyday work problems. It offers a ready-made file of methods, formulas, tables, and charts for engineering top efficiency into devices, components, or complete products. Covers a full range of topics, from accessories and assemblies to clutches, control devices, electrical components, etc. Includes such modern developments as ultrasonics and automated assembly. *Over 1100 drawings show vital design details.*

PRODUCT ENGINEERING DESIGN MANUAL

Edited by Douglas C. Greenwood

Editor, Product Engineering Design Digest

342 pp., 8½ x 11, over 1100 illus., $9.

The book provides a storehouse of material to stimulate you to new design ingenuity, and to help you gain improved mechanisms, better assembly methods, and savings in materials and time. Over 100 topics are systematically arranged and illustrated. You can see how each device works, what it does, and how it meets design requirements. Thus, the book gives you the "feel" of a problem by showing in detail what is good, what has been done, and what is acceptable.

Gives up-to-date facts and data on resistors

Just Published! This book thoroughly covers fundamentals and needed data in the use of resistors in electronic design. You get groundwork in the basic aspects of resistance and descriptions of each type of resistor, the materials used in its manufacture, and characteristics associated with each type. Comprehensive tables give most manufacturers' data, with specific types of resistors covered in common tables. Thus, a design or components engineer can easily determine the scope of what is available. Full attention is given to such important areas as reliability in resistors, measurements, etc.

RESISTANCE AND RESISTORS

By Charles L. Wellard

Technical Director, Clifton Precision Products Co.

264 pp., 6 x 8, 82 illus., $8.50

Among the book's many special features you will find a detailed treatment of precision films as a replacement of wire-wound resistors. Included, too, is information on the preparation of precision films by pyrolysis, evaporation, and reduction of oxides. Numerous charts and graphs present information that heretofore has seldom been readily available regarding the power and voltage ratings of resistors, the varieties of material used in their construction, and their many industrial applications.

Mail Your Order To:
Educational Division
TELEPHONE ENGINEER
PUBLISHING CORP.
7720 N. Sheridan Rd., Chicago 26, Ill.

ops about 2.5 per cent toll billing errors and adjustments, CAMA or operator identification of calling numbers develops about 3.5 per cent, and manual operations develop about 4.5 per cent. The percentages for DDD include wrong number billing occasioned by customer and equipment errors, which account for approximately 2.0 per cent of the total errors and adjustments.

I am personally enthused over the development of Premium DDD and feel it a major step towards Total DDD. Total DDD means that either our customer or operator can dial every type of call so that message detail is machine recorded to admit full automation in the accounting and billing of toll business. Our manufacturers and scientists are aggressively developing the means for this eventuality. We operating people can assist this progress by communicating our needs and by being open-minded to changes of restrictive operating methods and administrative procedures.

I have formed a concept of the ideal DDD system from my experience with Independent manufacturers and Bell System operating people. All of us are seeking systems compatible with the present and adaptable to the future.

My ideal is a system which has the capability for Total DDD, a centralized system which has the means for handling the non-coin Station, Person, Collect and Special Services DDD and which admits to the known potential to include coin, Enterprise, "WH," and Inward traffic in its operation. I look also for a possibility to operator dial non-network traffic through recording equipment to take advantage of some traffic work time savings and accounting automation in the rating and billing operation. If we get all this we may be content. However, by that time progress will have placed more objectives on our horizon. — *John B. Noggle.*

"Line Concentrators"

(Continued from page 27)

go back to the central office. Of the one and one-half miles, eight-tenths is through an area traversed by gullies and ravines, which is totally unsuitable for housing.

It is a rare situation indeed where an operating company would start out from the central office with only a 50-pair cable and we had no thought of doing this. Our plans called for a 200-pair cable for the first six tenths of a mile, a 100-pair for the next two tenths, and a 50-pair for the remaining seven-tenths of a mile. The built up area of the town is adequately cabled and while we planned larger cables we had no real need for these extra pairs through the built up area.

Without boring you with volumes of figures concerning the cost of cable, ditching, and labor, it suffices to say the project was estimated at $12,000, if only 50-pair cable was installed the entire distance.

At this time we were also aware of the availability of Line Concentrators. Prices of these units were obtained, along with estimates of the installation costs. These costs are tabulated as follows:

12 trunk, 49 Line Concentrator	$4,829.00
Labor to install	500.00
Total cost	$5,329.00

This unit required 15 pairs to operate, 12 for talking trunks, and three pairs for switching control. It provided us with 49 new pairs derived from 15 pairs for a net gain of 34 pairs. The original terminal can of 25 pairs would then provide service as follows:

10 Pairs — Direct service to rural lines
15 pairs — Concentrator usage — 49 lines

This application looked attractive to us for several reasons: First, the original cost was less than half of the projected cable project; second, it could be purchased and installed in less than a month, which would free our construction crews for other work; third, the unit was recoverable where buried cable was not; and,

fourth, it would supply service equally as good as direct cable pairs on a permanent basis or a temporary basis. This last point should not be overlooked.

The cencentrator gives us a chance to take a better look at the growth in the area. Today we might say that a 50-pair cable is entirely sufficient for the area and yet two or three years hence we might wish that we had originally installed a 100 or 200-pair cable.

Sorry we had to omit TE&M's regular features from this issue. They will be in their usual places in future issues.

It is entirely possible that the concentrator will become a permanent part of plant and yet, depending on the growth in the area, it may allow us to make a better estimate of our eventual needs later on. Guessing where, when, and how a town will grow is one of the problems that besets telephone people. A device that can forestall the exact decisions that must be made when an area is building up until the building has gotten well underway is worthy of consideration.

The high recoverability factor is something that is also worthy of note. The subscriber unit can be recovered when and if additional cable is brought into the area. Since the central office end is installed, the subscriber end unit could be removed and re-installed at another location in about 40 man hours. The only office change would be the moving of 15 jumpers on the main frame. Thus sometime in the future we could within the space of two days and for about $150. labor provide 34 additional pairs at any place in our cable plant where 15 pairs are now available.

Traffic Considerations

PERHAPS a word should be said about traffic considerations. As I mentioned earlier, concentrators are available in various numbers of lines and trunks; those having a larger number of trunks obviously will handle a greater amount of traffic. Tables are available from the manufacturers which show the unit-calls that each size unit will handle.

Next page, please

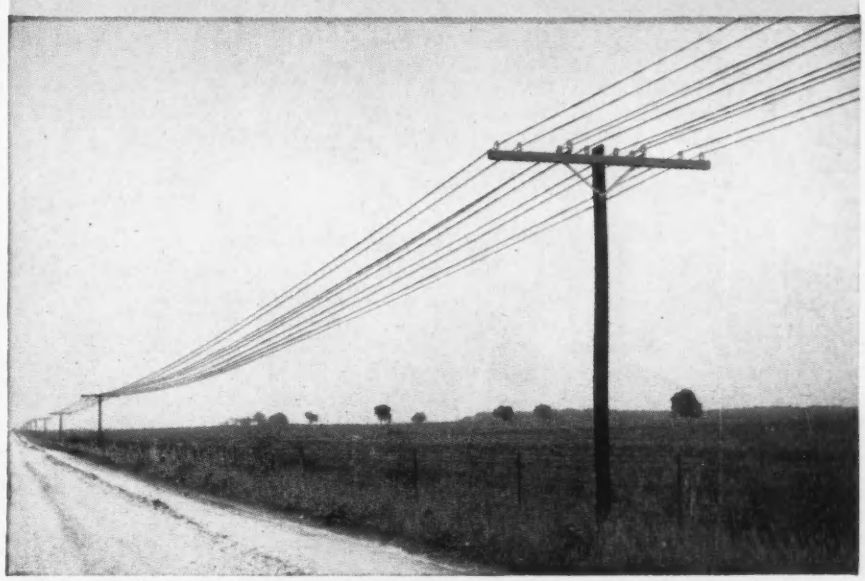
Crapo HTL-135

High Tensile Line Wire

MADE TO WITHSTAND HEAVY STORM LOADS

Time and time again, *Crapo* HTL-135 has demonstrated its ability to stand up under heavy ice and wind loads when other conductors failed. This can be attributed to the fact that *Crapo* HTL-135 combines high strength with high fatigue endurance plus superior elastic qualities which enable it to spring back into place when loads are removed. The result: service interruptions are minimized, re-sagging is seldom necessary, where this rugged telephone wire is used.

The excellent telephonic transmission characteristics of *Crapo* HTL-135 make practical subscriber loops of 14 to 15 miles with normal voltages and equipment. Longer loops are possible where higher voltages and more sensitive telephone sets are employed. For dependable, long-span, low cost rural lines, specify *Crapo* HTL-135.



HERE'S PROOF OF DEPENDABILITY

The Crapo HTL-135 in this typical rural line of 300-foot spans was subjected to two heavy ice storms within 14 months. This photo shows the line, without resagging, three months after the second storm.

Write for Manual TM-59 containing complete engineering data!

Crapo HTL-135
INDIANA STEEL & WIRE CO., INC. MUNCIE, INDIANA U.S.A.

INDIANA STEEL & WIRE CO., INC.
Muncie, Indiana

bring on the

Cablegard®

It pays to keep Cablegard* on hand . . . for there's no faster, lower-cost way to physically protect cable anywhere, above or underground.

Cablegard is a split-pipe sheath that *clamps around* cable. You get the protection of solid-wall pipe, yet you install in minutes—with no special skills needed. And with Cablegard, you can eliminate most cutting and splicing!

You'll be miles and dollars ahead—on every job—with Cablegard. Contact your equipment supply house or write direct to Butler Manufacturing Company for details.

Exclusive clamping tool quickly clamps halves together.

*Patent pending

BUTLER

BUTLER MANUFACTURING COMPANY
BUTLER CONTRACT MANUFACTURE DIVISION
7558 East 13th Street, Kansas City 26, Missouri
Manufacturers of Metal Buildings
Equipment for Farming, Oil Transportation, Outdoor Advertising

It should be noted at this point that the concentrator does not make connections between lines within the unit itself but rather connects any line desiring service, whether originating or terminating, to a trunk to the central office. Calls which both originate and terminate on different lines in the same concentrator therefore use two trunks for the duration of the call. The actual connection between lines is still made by the central office switchboard in the usual manner.

A true reverting call to another party on the same concentrator line uses only one trunk, but it is held for the duration of the reverting call. Manufacturing personnel are well acquainted with the operation of their equipment and should be consulted concerning these technical points.

Since we are a small company, we do not possess the metering equipment to make studies as to the exact usage of each individual line that was placed in the concentrator and I'll have to admit that we made "guestimates" based upon interviews with the customers and from our own knowledge of the calling habits of the area.

Knowing that the college was a unit unto itself led to the belief that reverting calling back into the area would be heavy. The unit that was purchased has 12 talking trunks and at present has 31 lines in use. Metering equipment on the concentrator has shown that since it was installed in June of 1959 we have had only three *all-trunk busy* conditions during this time. Obviously, we have too many trunks for the 31 lines in use, but it must be remembered that as many as 49 lines could be connected.

Situation #2

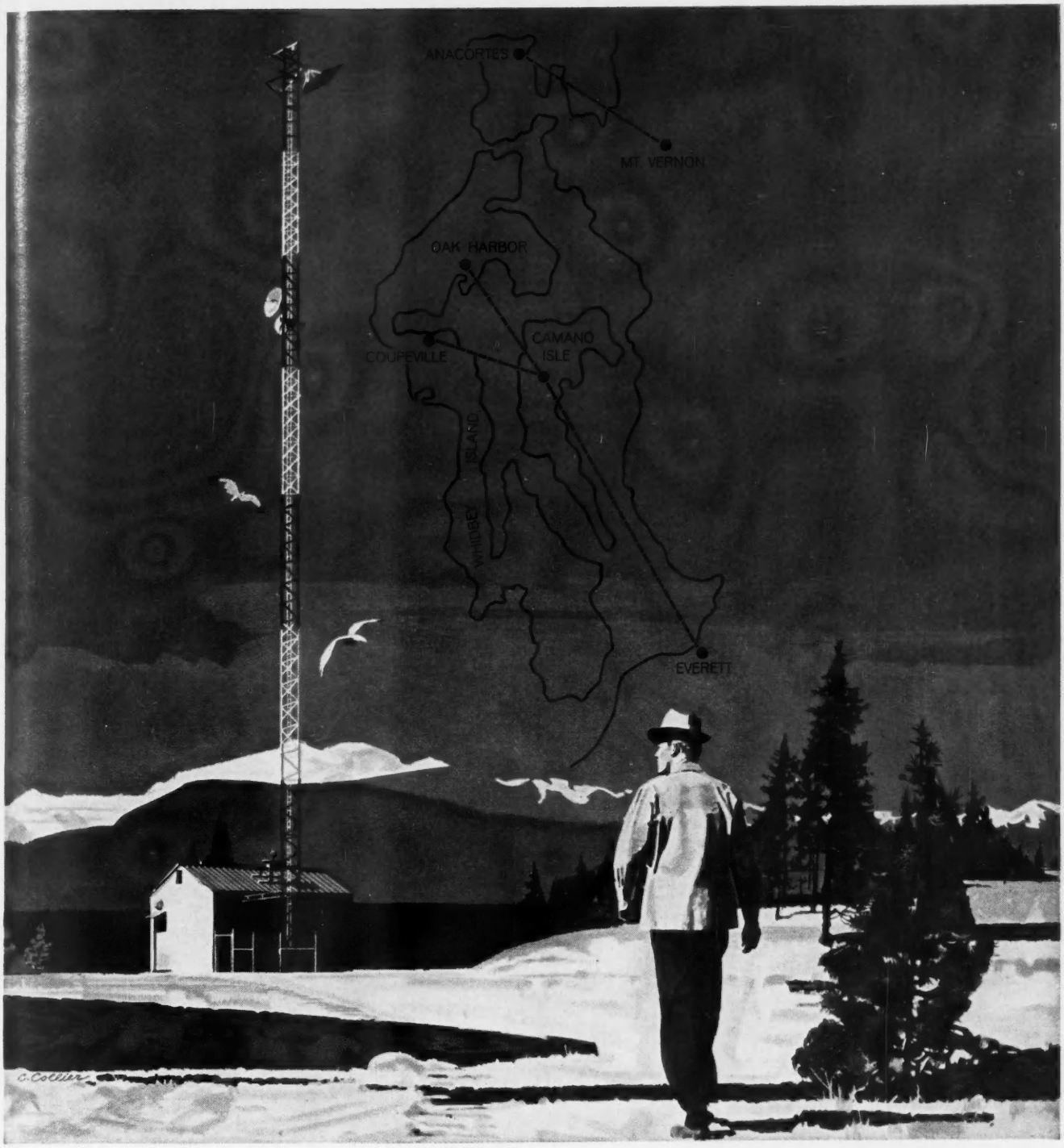
OUR SECOND concentrator was installed this past spring, partly based upon the excellent results we received from our first one. It is not any special case, but is in a residential area that may be like many that you have in your own towns. The cable plant, as I mentioned before, was installed in 1926 and at that time the area was thinly populated with houses — entire blocks void of homes, an adjacent block with only three or four houses in it. And frankly in 1926 this area was "on the wrong side of the tracks." Many homes did not have telephones in those days and those that did were mainly on four-party lines.

To bring you many of the papers presented at the recent convention of the U. S. Independent Telephone Association we were forced to omit the regular features from this issue. You'll find the features in their usual spots in future issues of TE&M.

When the cable plant was installed there were about three times too many pairs for the actual phones in service. (I've blessed that plant engineer many times for his foresight.) Well, houses have popped up here and there to fill the vacant lots. The whole complexion of the area has changed. It is no longer "on the wrong side of the tracks." The original cable was sufficient until about 1958 when we had to restrict new installs to four-party service. A new 28-bed hospital was built in one of the vacant blocks and we had to back string with drop wire to get three trunks for their PBX board.

Here seemed to be an ideal spot for a concentrator. It was an old established residential area in the form of a triangle, blocked from growth on two sides by the railroad tracks and on the third side by an already built up area. Thirty-five pair, properly spread throughout this six square block area would solve the problem. We would be able to provide the type of service that was desired; many upgrades could be accomplished.

A 15-pair terminal in the center of the area was chosen as the location for the new unit, which was a nine-trunk, 49-line Line Concentrator. Eleven pairs were required for its operation, leaving four pairs for direct service. Three of these were used for the PBX trunks to the hospital and the fourth for a high usage four-party line in the area. Two 18 pair aerial urban distribution cables were extended from the unit one block



WEST COAST TELEPHONE COMPANY CHOOSES COLLINS MICROWAVE

to link Puget Sound island communities with mainland...

This frequency diversity system provides 56 channels for service to communities on Camano and Whidbey Islands out of a terminal at Everett, Washington. Included are more than 25 miles of overwater spans. Another Collins system installed for this company more than 3 years ago provides service between Anacortes and Mount Vernon. For information on a microwave system custom-tailored to your own needs, contact Collins Radio Company, Texas Division Sales, 1930 Hi-Line Drive, Dallas 7, Texas.

COLLINS MICROWAVE AND CARRIER

COLLINS

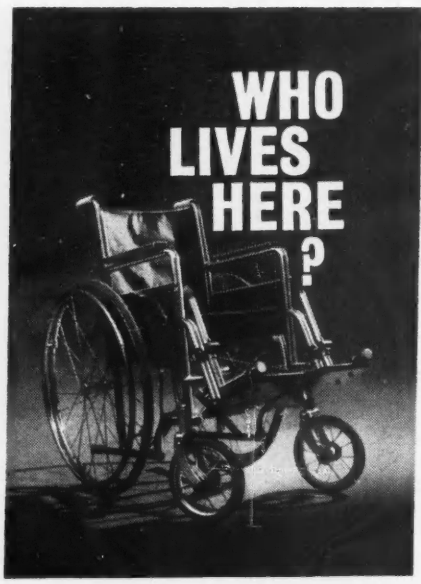
COLLINS RADIO COMPANY • DALLAS, TEXAS • CEDAR RAPIDS, IOWA • BURBANK, CALIFORNIA

WORLD'S FINEST STAPLING GUN
for wire or tubing

HELLER-TM-1

The Heller TM-1 one-hand automatic stapling gun is specially designed for quick professional fastening of wire or small tubing. With controlled power chamber, staples can't pinch wire yet lock securely in hard or soft wood and plaster. One of a complete line of over 300 hand and power fastening devices made by Heller, a leader in the field for more than 35 years. Write Heller Industrial Fastener Division, Heller Roberts Mfg. Corp., 6115 Carnegie Ave., Cleveland 1, Ohio.

HELLER ROBERTS
Manufacturing Corporation



A child . . . one of tens of thousands who need your help. Please give generously to the

MARCH FOR MUSCULAR DYSTROPHY

MUSCULAR DYSTROPHY ASSOCIATIONS OF AMERICA, INC.
1790 Broadway, New York 19, New York

north and one block south, which were further on distributed out east and west by 11 pair urban distribution cables. Eleven pairs were terminated in a new can at the concentrator. You see that of the 49 derived pairs, 47 are now directly available through the area.

This entire project was done for $5,400. A 50-pair cable into the area was figured at approximately $9,400. And the whole construction project was done by four men in three days.

Maintenance

UP TO THIS time I have not mentioned the maintenance problems and really they are hardly worth mentioning. The 12-trunk unit has had two cases of trouble that were both cleared in less than 30 minutes, neither of which affected service to more than one line. The 9-trunk unit has had two faults which were readily cleared and involved relay adjustment. Each unit is checked for proper trunk rotation once a week from the central office end. This inspection involves about 10 minutes for both units. Since no faults have been discovered by these inspections we are considering changing them to monthly inspections.

By describing these two situations I don't mean to imply that Line Concentrators are the answer to all cable problems. Generally speaking large housing developments in new areas where no cable facilities exist lend themselves better to cable installations, especially if large numbers of pairs are involved.

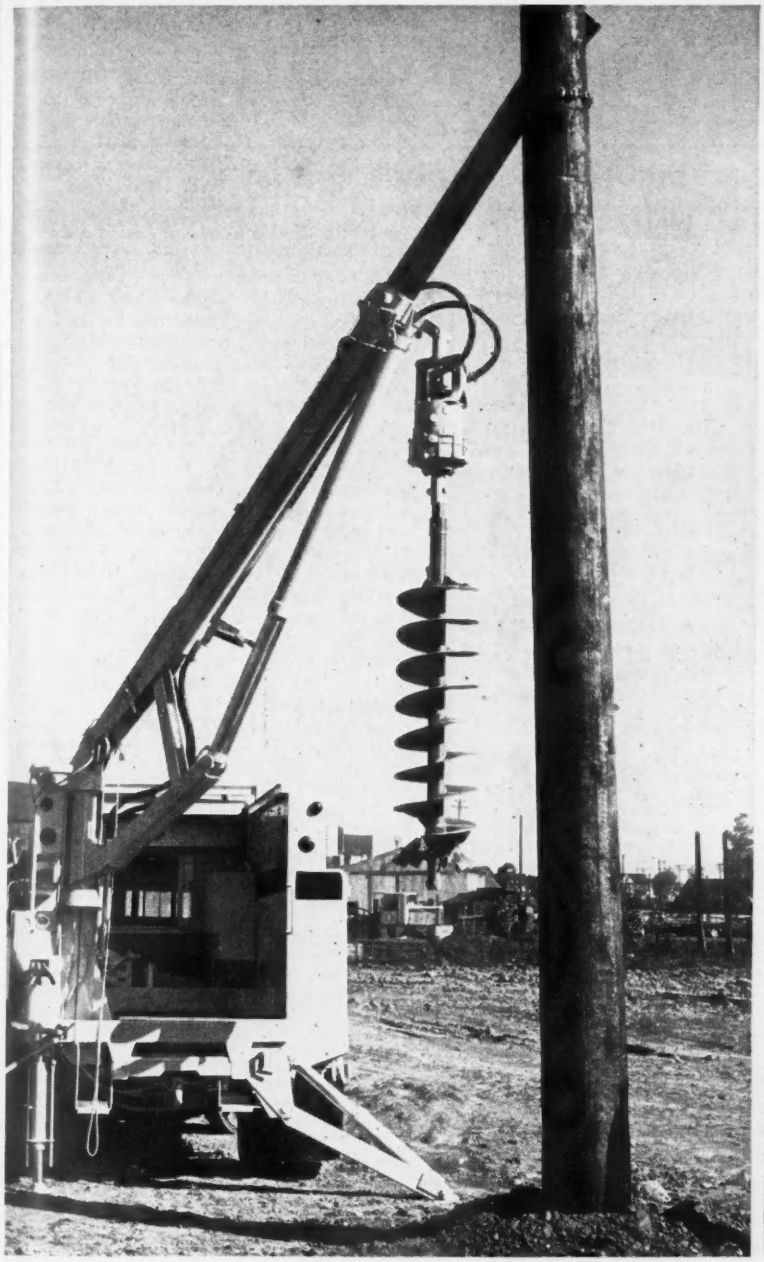
USITA Plant Conference Speaker ROBERT C. HUNT, general manager, Blair Telephone Co., Blair, Neb.

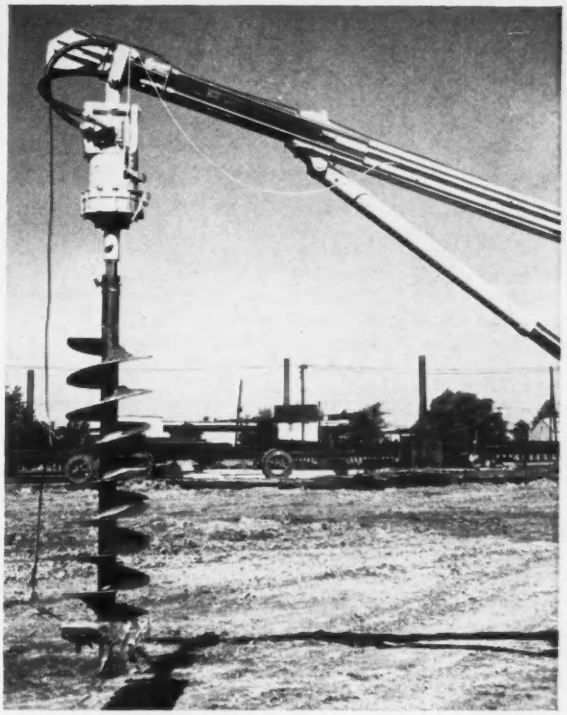
Concentrators, in their present stage of development, are not designed to replace small satellite offices, although work is underway to make this a reality. It is interesting to note that at least one manufacturer has under development a unit that will operate in conjunction with carrier equipment so that it may be operated in rural areas over two copper pairs. Other development is going on to make the concentrator establish connection within itself so that pairs are not used during the conversation but only during the time that the call is being dialed and rung. It has even been hinted that central offices of the future may become merely a common supervisory machine that will control the action of many concentrators situated throughout a large city.

All of this effort is directed toward one goal, and that is to make our plant facilities more efficient so as to be able to render better service and to constantly attack the problem of ever increasing costs.

I hope many of you will visit our manufacturers while at this convention to get the facts concerning these interesting devices. They may be able to help you out of a perplexing plant or financial problem. At least in the back of the mind of every plant engineer, when he comes to grips with the problem of cable expansion should be the question — "What about a concentrator?"

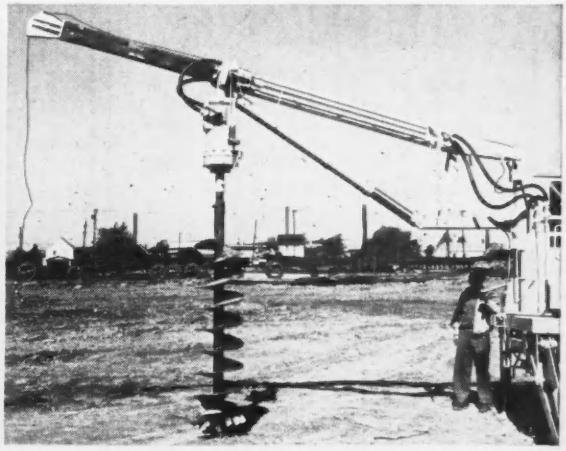
During this presentation you will note I have avoided any concrete references to costs and revenues, because labor costs vary from company to company. Your situations vary widely, such as the distance you might have to go from the central office. Rates for service also vary from company to company, hence it is difficult to say from this speakers' stand that you should or should not install a Line Concentrator. Every situation is different, but it should be explored. If I have only made you conscious of the fact that Line Concentrators exist and do a job I have accomplished my purpose. — *Robert C. Hunt.*





Semi-automatic device locks borer on end of extendible boom for digging.

Borer automatically locks to end of main boom when retracted, leaving extendible boom free for pole setting.



Diagnosis: High Feed Pressure

Strongest corner-mounted derrick in the field is Holan's 7500 — a powerful, time-saving derrick that operates in an arc behind and to the right side of the truck.

Here's power . . . real power . . . all the up and down feed pressure needed to drive any derrick-suspended digger. And more than that, it's the only corner-mounted derrick built capable of handling Holan's rugged 3-speed 5400 Earth Borer.

Jobs can go ahead on schedule — even in alleys, narrow streets and congested areas because positioning problems are ended. Parked parallel to the curb, the 7500 swings over . . . even over fences and guard rails . . . reaches out . . . and digs deep holes, sets poles up to 70 feet in length.

The 7500 is engineered as a complete unit to avoid body and derrick stresses . . . can "live boom" 8,500 pounds, winch 10,000 pounds.

A semi-automatic locking device moves the earth borer onto the extendible boom for digging . . . or to its main boom storage position.

The 7500 . . . shown here mounted on the left side . . . is available mounted on the right side. It reaches up 27'-6", 18½' behind the truck, and beyond the right side 12'-3" (left-side mount) and 16'-10" (right-side mount) with boom extended.

Before you buy any corner-mounted derrick, write us — or call your Holan Field Representative — for complete details.

Holan Corporation, 4100 West 150th Street, Cleveland 35, Ohio
Plants in: Cleveland, Ohio; Griffin, Georgia; Phoenix, Arizona

Holan

Subsidiary of THE OHIO BRASS COMPANY

HOLAN

TELEPHONE MARKET PLACE

Largest Circulation Serving The Telephone Industry

HELP WANTED

CABLE SPLICERS Station Installer, Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1800 Johnson Street, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

AMBITIOUS MEN — Qualified as station installers, equipment installers, cable splicers, linemen. Work in midwest. Harris McBurney Co., Inc., P. O. Box 267, Jackson, Michigan.

TELEPHONE COMPANY DIVISION ENGINEER needed immediately. Engineering experience should include outside plant, special services and PBX & PABX. This position is with a large Florida Independent Telephone Company. Salary commensurate with experience and qualifications. Please send detailed resume and photo to Box 137, Telephone Engineer. All replies strictly confidential.

TELEPHONE ENGINEERS

INSIDE PLANT
OUTSIDE PLANT

WEST COAST LOCATIONS

SALARIES TO $12,000
PER YEAR PLUS
PER DIEM & RELOCATION

Unusual opportunities for capable personnel experienced in all phases of inside and outside telephone engineering.

Other locations U. S. A. and Overseas.

Age no barrier

Direct Detailed Resume To —

D. E. DIMMIG
Employment Manager

PHILCO

TECHREP DIVISION

P.O. BOX 4730, Philadelphia 34, Pa.

Replies Confidential

POSITION WANTED

YOUNG FAMILY MAN, 2 years college, 2 years experience REA specifications as field engineer with engineering firm desires permanent position with Independent Co. Box 136, c/o TEM.

FIELD ENGINEERS

TELEPHONE INSIDE PLANT ENGINEERS

Minimum 8 years experience necessary with BSEE degree preferred. General inside plant engineering background to include teletype systems experience.

TELEPHONE OUTSIDE PLANT ENGINEERS

Minimum 8 years experience necessary with BSEE degree preferred. General background in outside plant engineering to include experience in the latest telephone cable gas pressurization techniques.

These assignments and subsequent services will be at Mid-Western Air Force Bases. Submit a complete resume including minimum salary requirements in confidence to:

MR. H. J. RECKAS, Personnel Mgr.

Advanced Communications Engineering

A Division Of
Cook Electric Company
Chicago, Illinois

6038 Twenty Eighth Ave., S. E.
Washington 23, D. C.

INFORMATION WANTED

WANTED — Information as to whereabouts of Norris Frady. Possibly DBA, Rutherford Tree Service. Please call collect Millington Tel. Co., Millington, Tenn., CA 3-3321.

FOR SALE

PARTS FOR 302 W. E. TELEPHONES, guaranteed, clean, complete, operational. All prices lots of 50 or more. P-29500 Switch-hook spring assembly 20¢ each. F1 Transmitter 35¢ each. HA1 Receiver 50¢ each. 195-A Condenser 25¢ each. F1AW-3 Handsets $1.25 each. 101-A Induction Coil 35¢ each. Kellogg 20 and 30 cy. and W.E. straight line ringers 75¢ each. 5H Dials $1.50 each. Write — M. R. Anderson, 2511 W. Jean St., Tampa, Fla. Phone RE 7-2998.

NEW—COOK XB. POLE TERMINALS. 16 PAIR — UNPROTECTED, WITH 6 FT. STUBS. $6.00 EA.

NEW—SPAN CLAMPS, MESSENGER WIRE TYPE. .10c EA.

REBUILT—W. E. DIALS. 5-H — or 6A — $2.50 EA.

USED—GOOD—323 CALCULAGRAPHS. $35.00 EA.

REBUILT — OR SOLD AS REMOVED FROM SERVICE, STROMBERG SUBSCRIBER SETS. 1250 WALL — DESK — 1243 — 1443 — 1543-A. WITH DIALS, 8T LINE — or 20-30-40-50 CY.

INDEPENDENT TELEPHONE REPAIR CO.
2137 West 21st St. Chicago 8, Ill.
LAfayette 3-5439

WESTERN ELECTRIC PBX SWITCHBOARDS

W. E. #551-A PBX Switchboards, 30 to 40 lines, 5 to 10 trunks, 10 cord circuits. (As removed from service or Reconditioned)

W. E. Type 52 Operators Sets (New)

Battery Eliminators and Subcycles (Recond.)

BUCKEYE TELEPHONE & SUPPLY CO.

1250 KINNEAR RD. COLUMBUS 21, OHIO

HUDSON 8-0655

FOR SALE

MAGNETO TELEPHONES — Leich 901 wall or desk magneto telephones. Cleaned, tested and guaranteed, $16.50 each. As removed from service $15.00 each. Turtle Lake Tel. Co., Turtle Lake, Wisc.

ONE NORTH McBERTY MCX 500 selector type dial switchboard, equipped with 250 lines. Now crated, ready for pick up — $3,500.00. One North all relay MCX 200 (broadspan) switchboard, charger, batteries, main frame, and powerboard. Equipped 100 lines, 200 line capacity. Now crated and ready to pick up — $2,000.00. Used dial telephones: 370 Western Electric 302-D; 78 North 9800; 29 North 9000; 164 Leich 615; 142 Stromberg Carlson 1243; 150 Stromberg Carlson 1250. Priced at $5.00 each. $4.50 in quantity lots of 50 or more. Polar Rural Telephone Corp., Park River, N. Dak. Phone BUtler 4-7221.

1 **HERCULES** H.W.B. Generator Motor set. 75 K. W. Gas emergency engine alternator complete. Less than 200 hours after factory overhaul. Perfect condition. Cohen Salvage Co., P. O. Box 5, Boulder Highway, Henderson, Nevada.

WANTED TO BUY

INDIVIDUAL interested in purchasing any small telephone company. Write Box 135, c/o TE&M.

WANTED — All makes, old telephones. Our truck will pick up and pay you cash on the spot. Telephone Co., Turtle Lake, Wisconsin.

WANTED TO BUY

TELEPHONES — Any condition. Desk stands, wall sets, etc. Advise quantity available. Write Box 78, c/o TE&M.

BUY OR MERGE — Well-established telephone equip. manufacturer with international distribution desires to purchase or merge smaller company with good potential but limited sales. Write Box 134, c/o TE&M.

BELTS-CLIMBERS

BELTS — CLIMBERS — Complete Linemen's equipment. W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.

BOOTHS

BOOTHS — Telephone — Outdoor — Indoor — Steel — Stainless Steel — Sherron Metallic Corp., 1201 Flushing Ave., Brooklyn 37, N. Y.

CORDS

CORDS. Switchboard (with or without plugs), Instrument (straight and retractile cords in eleven colors. — Commercial Cord Co., Inc., 26 Main St., Clifton Springs, New York.

CONSTRUCTION EQUIPMENT

BORING MACHINES, EARTH — Highway Trailer Co., Edgerton, Wisc.

CONSTRUCTION EQUIPMENT

HYDRAULIC CONTROL

STERLING

EARTH BORING MACHINES

WYOMING VALLEY EQUIP. DIV.

714 WYOMING AVE. · KINGSTON, PA.

DIAL REBUILDING

DIALS, Rebuilt

Telephone Repair & Supply Co.

1760 W. Lunt Avenue, Chicago 26, Ill.

DECALS

DECALS

Made for trucks and equipment

Small or large quantities

Write for free catalog.

MATHEWS COMPANY

827 S. Harvey Oak Park, Ill.

DIRECTORY SERVICES

ADVERTISING DIRECTORIES — General Telephone Directory Co., 1800 Oakton Street, Des Plaines, Ill.

CARRIER, 3-Channel + VF

W.E. CFIA (Sig. Corps)
Repeaters, for use with CFIa
CF3A, new
W.E. C-Carrier Terminals
C.Carrier Repeaters
Filters — CAO Types

TEST BOARD EQUIPMENT

Patch cords & plugs
Jacks & Mountings
Relay Racks
Bridges—L&N
Transmission Measuring Sets
Portable line Test sets

MDF PROTECTORS Complete

W.E. #1435 W, 20 pr. $10 new
1268 A, 20 pr. 10 new
1269 A, 20 pf. 10 new
Cook #100 ..... 15 new
A.E. #675, 20 pr..... 10 new
22 pr..... 12 new
MDF VERTICALS, W.E. & Cook cable rack & fittings, Ladders

W.E. Interior Terminals & Chambers protected & unprotected types
Raytheon Rectichargers - Rectifilters
24 Volt — 48 Volt

SWITCHBOARD PARTS (all mfg.) New & Good Used

Jack & Lamp Strips
Line & cut-off relays, trunk, etc.
Cord & plugs, lamps & caps
Lamps:
W.E. A-1, 24 volt, new ..... $16 C
G.E. 24B, 24 volt, new ..... 16 C
G.E. 18B, 18 volt, new ..... 16 C
many others (same price)

Shipped On Approval
Satisfaction Guaranteed
Huge savings on everything in our multi-million dollar stock.
Let us quote on your other needs

SWITCHBOARDS, manual

W.E. #12 (universal) new (also BD110)
W.E. #605 PBX new, 2 position #550B, rebuilt — 80 Line
W. E. #551A rebuilt 20 to 60 line
W.E. #506 PBX (cordless) 7 to 12 line, rebuilt
W.E. 507B Rebuilt — $450.
Kellogg CB (universal) 1600 type Per spec. #38008 (post war)
12 positions available
16 cord circuits (univ. per #4501-1, 5)
SI, 2 or 4 or 10 party ringing
#258 jacks and #25 lamp jacks wired to multiple cables (little wear)
Line & cut-off relays wired to term. on relay racks — also trunk & mag equip. power board, etc. (priced to move now)
Kellogg PBX K-100 (100 line) new & Rebuilt
Kellogg PBX (Cordless) #1007 CCX
5x12, brand new $150
Like New $100
5x20 — 2007-11, Like New $150
Kellogg 200 line CB-LB Central Office, used 1 year (like new) $800
Kellogg Fire reporting 40 & 100 Line
Kellogg Magneto Cordless 24 Volt-Lamp Signals, 20 Line New $150
12 Line New $100
Note: Lines convertible to CB with kick coils (C-111 $1.00 each)
Stromberg-Carlson #106 PBX (80 line) like new $400

Telectric Co.

1218 VENICE BOULEVARD (DDD 213) RIchmond 8-2249 LOS ANGELES 6, CALIF.

DIRECTORY SERVICES

EVERY MONTH

More and More Telephone Companies use DIRECTORIES produced by

Your Inquiry Respectfully Solicited

LELAND MAST DIRECTORY COMPANY

1619 GREENWOOD WILMETTE, ILL.

POLES

POLES. Southern Yellow Pine — Taylor Colquitt Company, 217 Main St., Spartanburg, S. C.

POLES, Southern Yellow Pine Pressure Creosote and Creo-Penta — Piedmont Wood Preserving Co., P. O. Box 700, Augusta, Georgia, Spartanburg, S. C.

POLES, Southern Yellow Pine — Texas Creosoting Co., Orange, Texas.

POLES • CROSSARMS

RAIL or TRUCK DELIVERY

Pressure-treated to your specifications. 16 sales offices, 34 plants serving you. See Yellow Pages, write or call Pittsburgh EXpress 1-3300.

C-16

KOPPERS COMPANY, INC.
Wood Preserving Division
777 Koppers Bldg., Pittsburg 19, Pa.

PROTECTIVE EQUIP.

PROTECTIVE EQUIPMENT — Reliable Electric Company, 11333 Addison St., Franklin Park, Ill.

TOO LATE TO CLASSIFY

FOR SALE

Brackets, Transposition, Case, Roller Type, Mid-Span with Insulators
800 No. S.E. 1611 Right Hand
900 No. S.E. 1590 Left Hand
Brackets, Transposition, Case, Roller Type, for Crossarms with Insulators
900 No. S.E. 1648 Right Hand
900 No. S.E. 1780 Left Hand
Brackets, Transposition, Point Type for Crossarms, Hubbard No. 9272 with lead bobb.
900 Right Hand
900 Left Hand
NEW YORK CENTRAL SYSTEM
466 Lexington Ave., New York 17, N. Y.

HELP WANTED

OUTSIDE PLANT ENGINEERS, Technicians, and Supervisory Personnel. Many locations both east and west coast and midwest. Kay & Associates, 1605 Palm Drive, Mt. Prospect, Ill.

A SMALL AD COVERS THE FIELD

PROFESSIONAL SERVICES

ALLEN K. HAMILTON ASSOCIATES, INC.
CONSULTANTS - SYSTEMS ENGINEERS
GENERAL ENGINEERS
WOODSTOCK, ILLINOIS TELEPHONE FEderal 8-2400

INSPECTION SERVICE
"AT TIMBER TREATING PLANTS"
Of poles, crossarms, and preservative treatments. Analysis of wood preservatives
Consultation and specification writing
A. W. WILLIAMS INSPECTION CO., INC.
MOBILE, ALABAMA
New York St. Louis Portland
Inspectors stationed throughout the U.S.A.

MURPHY ELECTRONIC RESEARCH DEVELOPMENT MANUFACTURE
ENGINEERING LABORATORIES, Inc.
4419 TULSA
HOUSTON 24, TEXAS
Write For FREE Literature

McGRATH ENGINEERING, INC.
Consulting Engineers
209 West 6th Street
TOPEKA, KANSAS
Telephone CEntral 2-2358

CARL C. CRANE, INC.
Consulting Engineers
121 S. Pickney Street, Madison 1, Wisc.
Telephone ALpine 6-0247

PROFESSIONAL ENGINEERING AND CONSTRUCTION SERVICES
Plant Construction Crews • Installer Repairmen
Cable Splicers

CENTRAL OFFICE INSTALLATION
Complete central office routines, tests & adjustments, carrier installations, tests & alignments, key system installations

HENKELS & McCOY
PHILADELPHIA

1800 Johnson St. Elkhart, Ind. COngress 4-1121
Altanta, Ga. TR 5-2769
Ashland, Ohio 3-7543
Bloomington, Ill. 5-7717
Lebanon, Ky. 660
St. Johns, Mich. CA 4-4175
St. James, Minn. 492
Durham, N.C. 7-1316
Wausau, Wis. 2-2356
Victorville, Calif. 5-9012

PERFORMANCE Has Built Our Business

Davis UTILITY PLANT CONSTRUCTION **Construction Co.**
45 North Clark Street • Sullivan, Missouri

PROFESSIONAL SERVICES

C. D. EHINGER, P. E.
Consulting Engineer
Telephone Utilities
Mail Address:
639W. Madison
Decatur, Indiana

HARRIS-McBURNEY CO.
PUBLIC UTILITY CONSTRUCTION
A complete construction service for the telephone industry
Construction Crews Designing
Station Installers Appraisals & Reports
Cable Splicers C. O. Installation
Underground Duct Systems
Telephone ST 4-6126
P. O. Box 267 Jackson, Michigan

TELEPHONE EQUIPMENT

2000 Lbs. Capacity trailer. For ALL materials including pay out take up cable, line wire and drop wire. Priced RIGHT Write for illustrated literature NOW TODAY

WHITAKER REEL MFG. CO.
P. O. Box 1318 Monroe, Louisiana

Neuses

CABLE SHEATH STRIPPER
N-2878 – With 3 blades **$7.80 each**

Slits plastic or fabric covered cable. Rigid Phenolic Handle. Stainless steel saddle holds guide and blade in place. Groove guides and supports cable.

CABLE SHEATH SLITTER
N-62267 – With 2 blades **$4.20 each**

Tough, sharp hook blade digs in through most heavy-duty and all sizes of cables. Guide controls depth of cut.

P. K. NEUSES, INC. IMMEDIATE DELIVERY
511-21 N. Dwyer St., Arlington Heights, Ill.

Order Your Personal Copies of TE&M Today!
1 Year - 24 Big Issues - $4.00

ADVERTISERS' INDEX

ADC, Inc. 70
Advanced Communications Engineering 82
Aluminum Co. of America 4-5
American Tel. & Tel. Co. 50-51
Anaconda Wire & Cable Co. 6-7
Automatic Electric Co. 12-13, 22-23, 43-46

Bashlin Co., W. M. 83
Bartlett Mfg. Co. 75
Brand-Rex Division 41
Buckeye Telephone & Supply Co. 82
Budelman Electronics Corp. 74-75
Butler Manufacturing Co. 78

C & S Products 8
Cable Spinning Equipment Co. 64
Chance Co., A. B. 14
Chisholm-Moore Hoist Div. 69
Collins Radio Co. 79
Commercial Cord Co., Inc. 83, 86
Communications Equipment & Engrg. Co. .. 64
Cook Electric Co. 49
Crane, Inc., Carl C. 84

Davis Construction Co. 84
Dahl Co., George W. 68

Ehinger, C. D. 84
Electronic Secretary Industries, Inc. 54-55

Gagne Enterprises, Inc. 70
General Electric Co.
(Communications Products Dept.) 11
General Machine Products Co. 72
General Telephone Directory Co.
..... 83, Inside Front Cover
Gladwin Plastics, Inc. 48

Hallamore Electronics Co. 56
Hamilton Associates, Allen K. 84
Harris, McBurney Co. 84
Haydon Co., A. W. 65
Heller Roberts Mfg. Corp. 80
Henkels & McCoy 84
Highway Trailer Co. 83
Holan Corp. 81

ITT Kellogg 9-10
Independent Tel. Repair Co. 82
Indiana Steel & Wire Co., Inc. 77

Keystone Steel & Wire Co., Inc. 24
Koppers Co., Inc. 84

Larsen's Mfg. Co. 85
Leich Sales Corp. 18-19

Mast Directory Co., Leland 84
Mathews Co. 83
McGrath Engineering Co. 84
Murphy Engrg. Laboratories, Inc. 84

National Telephone Supply Co. ..... Back Cover
Neuses, Inc., P. K. 84
North Electric Co. 16-17

Phelps-Dodge Copper Products 66-67
Philco TechRep Div. 82
Piedmont Wood Preserving Co. 84
Preformed Line Products Co. 59-63
Pruzan Co., Jack 69

Railway Communications 38
Reliable Electric Co. 84

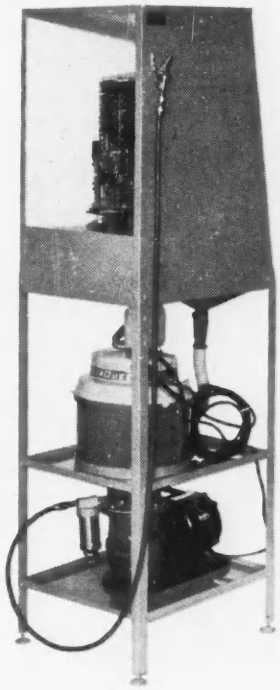
S & G Manufacturing Corp. 72
Sherron Metallic Corp. 83
Stromberg-Carlson 2-3, 35
Superior Cable Corp. 73

Taylor-Colquitt Co. 84
Telectric Co. 83
Telephone Repair & Supply Co. 83
Texas Creosoting Co. 84
Thornhill Publishing Co. 74

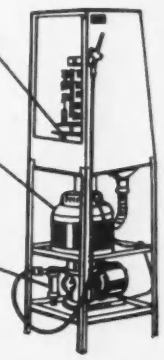
U. S. Instrument Corp. 25
U. S. Steel Corp. (AS&W) 71

Warren Manufacturing Co. ..... Inside Back Cover
Whitaker Reel Mfg. Co. 84
Whitney-Blake Co. 15, 53
Williams Inspection Co., Inc., A. W. 84
Wyoming Valley Equipment Div. 83

CLEAN
ING
CABINET



Made especially for pressure cleaning of central office equipment, switching gear, plug in units, etc. Cleaning Cabinet is completely self contained with its own air compressor and vacuum dust-gathering system. Requires only 2¼ sq. ft. of floor space. Legs are fitted with swivel base threaded glides for easy leveling. Finished with white enamel inside and neutral grey outside. Every central office needs one.



Ball Bearing Turntable in upper housing supports standard switch stand and permits easy access to all sides of unit being cleaned.

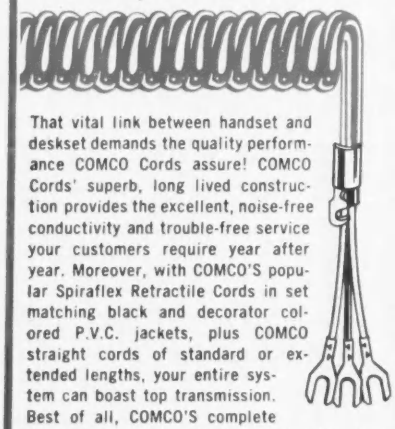
Vacuum Cleaner with 1 HP motor draws dust-laden air from inside of cabinet. Has easily replaceable dust filters.

Air Compressor (⅓ HP) rated 40 lbs. continuous pressure. With moisture extractor, air filter, 5' hose and blow gun.

LARSEN'S MFG. CO.
1001 Third Ave. N.E., Minneapolis 13, Minn.

WHAT'S MISSING?

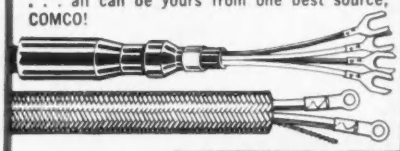
His COMCO Spiraflex Retractile Cord, of course!



That vital link between handset and deskset demands the quality performance COMCO Cords assure! COMCO Cords' superb, long lived construction provides the excellent, noise-free conductivity and trouble-free service your customers require year after year. Moreover, with COMCO'S popular Spiraflex Retractile Cords in set matching black and decorator colored P.V.C. jackets, plus COMCO straight cords of standard or extended lengths, your entire system can boast top transmission. Best of all, COMCO'S complete line includes cords with the construction, terminals and strain relief you require, and immediate delivery is COMCO'S pride.

Choose all your cords from COMCO

Black or brown nylon jacketed operator cords . . . nylon jacketed switchboard cords in white, slate, red or green . . . deskstand, test, patch and inter-communication system cords with tough P.V.C. jackets (ten colors and black) . . . all can be yours from one best source, COMCO!



Write for Catalog, Samples and Prices

COMCO

COMMERCIAL CORD COMPANY, INC.

CLIFTON SPRINGS, N. Y. • HOward 2-2311

Distributed by: LEICH SALES CORP.
427 W. Randolph St., Chicago 6, Illinois

AUTOMATIC ELECTRIC SALES CORP.
Northlake, Ill.

THE BACK OF THE BOOK

By JOHN G. REYNOLDS

Your Right To Vote

THE Editors of "The Transmitter," a magazine published for the employes of the Chesapeake & Potomac Telephone Companies, recently brought their readers a full-page reproduction of "An American Voter's Creed," which we are publishing below as a reminder that the vote we cast is both a right and a privilege and that your responsibility is to encourage family members and friends to vote, according to their convictions.

An American Voter's Creed

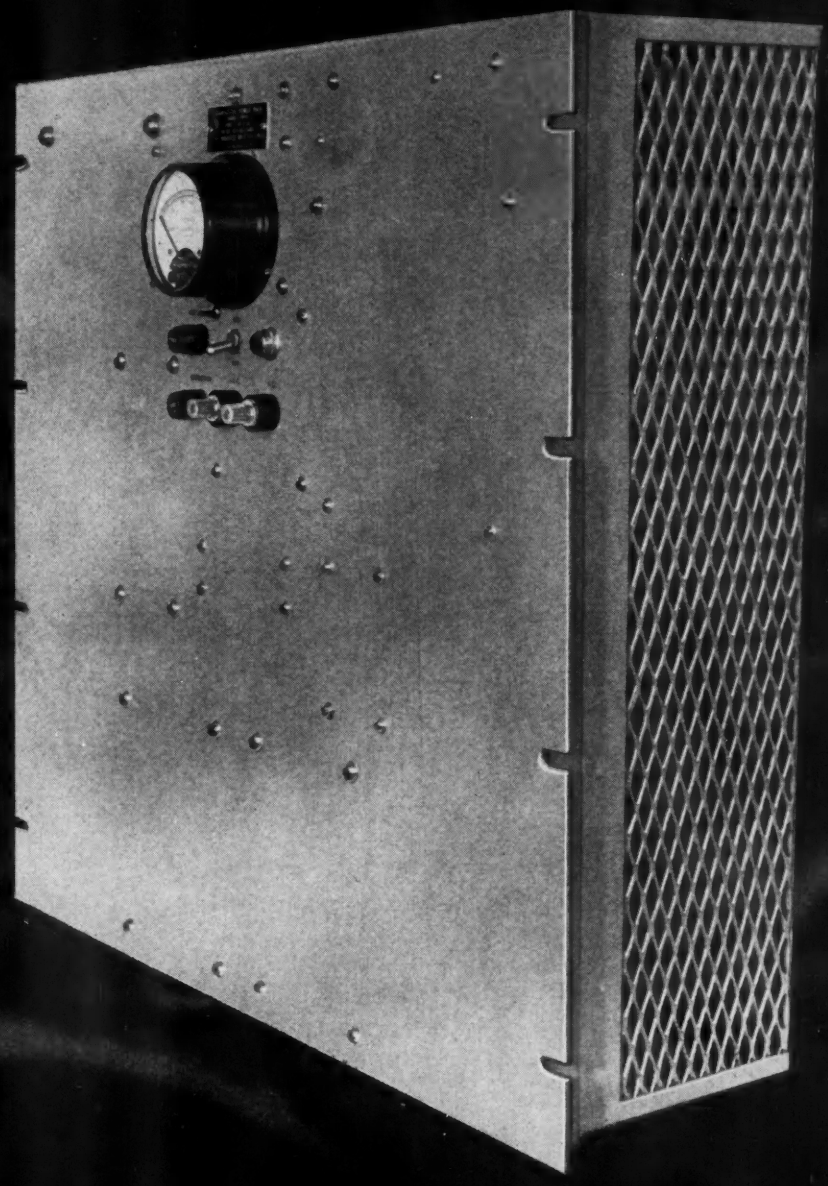
The right to vote is a sacred one. My forefathers died to bequeath me this right. It is my duty as a citizen to exercise it. In so doing I have a solemn obligation to discharge this responsibility with care and wisdom and full understanding of the issues involved. Whim and indifference must play no part in my decision. The future of my town, county, state and country lies in my ballot. It is my duty, therefore to inform myself fully about the candidates—who they are, what they stand for, how they will govern. Then—and only then—will I be qualified to make my selection.

I shall select on the basis of wisdom rather than wit; courage rather than charm; attitude rather than appearance. I will and must do everything I can to elect the right person to the right job.

As a voter and a responsible American citizen, I can do no less.

Make your voice heard in the people's choice—vote November 8.

— Reprinted from "The Transmitter"



Introducing... the new Warren Transistor Power Pack

Here, for the first time: a complete power, ringing and tone supply for PBX, PAX, and PABX installations . . . in one compact, economical package!

This Warren Transistor Power Pack is an entirely new design. It combines a battery charger/eliminator with a ringing generator and a dial/busy tone generator . . . a complete, integrated power supply for PBX type installations that will save you money.

Why?

. . . because it packs more power in less space than any power supply available.

. . . because its initial cost is lower than the cost of buying individual components separately.

. . . because it's all transistorized for increased operating efficiency.

. . . because there is no maintenance problem. No moving parts, no "aging" problems — every component conservatively rated for 30-year life.

. . . because it requires no standby equipment where batteries are used in PBX (both ringing and tone generators are d.c. operated).

For complete information, write or call (collect).

SPECIFICATIONS

Models — seven 24-volt models, seven 48-volt models available

Charger/Eliminator capacity — 6–40 amps in 24 v. units 3–20 amps in 48 v. units

Ringer — input, 24 or 50 v. nominal output, 7.5 watts, 100 v. 20 cycles

Dial/Busy tone Generator — input, 24 or 50 v. nominal output, 25 milliwatts, 600 cycles modulated at 120 cycles

Line Load Regulation (used as Battery Charger): ± 1% from 0-100% load. 20 millivolt ripple

Line Load Regulation (used as Battery Eliminator): ± 2% from 0-100% load. 30 millivolt ripple

Dimensions: 23" wide x 8 21/32" deep x 22½" high

Mounting: standard 23" relay rack

WARREN MANUFACTURING WM

First in transistor products for the telephone industry — sold through leading telephone equipment manufacturers.

THE WARREN MFG. COMPANY, INC. Littleton, Massachusetts. Tel. HU 6-3511

Shortest way to Short-proof splices...

Nicopress Splice Separators...

Ideal combination for full-strength, short-proof splices in parallel and twisted-pair wires... Nicopress Sleeves and Nicopress Splice Separators.

Nicopress Splice Separators save time, save tape, eliminate need for staggering splices, provide neater splices, eliminate shorts. Linemen readily make full-strength equal-tension splices in both parallel and twisted-pair conductors with Nicopress Sleeves and Tools, then merely snap the high-dielectric Nicopress Separator between the two splices. Tape is easy to apply over the insulated splices.

Nicopress Splice Separators are available in two sizes... 3456-B for both parallel and twisted-pair drop wire, and 3457-CD for rural distribution wire.

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

Nicopress is the Registered Trade Mark of The National Telephone Supply Company